SEYF DOG SHOW
SKILL-A-THON STUDY GUIDE

Each Age Division will have a separate section to study.

SKILL LEVELS

Exhibitors will be required to demonstrate a variety of skills based on their age division.

JUNIORS – BREEDS

Different classes
Breed types in each class
Breed Class descriptions (i.e. Hound Group was used for hunting)

INTERMEDIATES – NUTRITION

Body Condition Scoring
Nutrients
Feeding
Exercise

SENIORS – HEALTH/DISEASES

Wellness Program
Vaccinations
Internal Parasites
External Parasites

OHIO STATE UNIVERSITY EXTENSION

4-H 201R

Dog Resource Handbook

THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

References

American Kennel Club. 2002. *The American Kennel Club dog care and training.* 2nd ed. NY: Howell Book House.

American Kennel Club. 2006. *The complete dog book.* 20th ed. NY: Ballantine Books.

American Kennel Club. Canine Good Citizen® Program. akc.org/dog-owners/training/canine-good-citizen.

American Kennel Club. *Careers in dogs.* akc.org/events/junior-showmanship/careers.

American Kennel Club. *Safety around dogs: The AKC's safety education program for children.* akc.org/pdfs/PBSAF2.pdf.

American Kennel Club℠. akc.org.

Assistance Dogs International, Inc. assistancedogsinternational.org.

Bonham, Margaret H. 2000. *Introduction to dog agility.* Hauppauge, NY: Barron's Educational Series, Inc.

British Columbia SPCA. *Bite free: Playing it safe with dogs* [video]. spca.bc.ca.

Buffington, Tony. Body Condition Scoring Chart. The Ohio State University, College of Veterinary Medicine.

Campbell, Karen L., John R. Campbell, and James E. Corbin. 2004. *Companion animals: their biology, care, health, and management.* Upper Saddle River, NJ: Pearson-Prentice Hall.

Fogle, Bruce. 2000. *The new encyclopedia of the dog.* NY: Dorling Kindersley.

Gilbert, Edward M. Jr. and Thelma R. Brown. 1995. *K-9 structure and terminology.* NY: Howell Book House.

Mehus-Roe, Kristin, ed. 2005. *The dog bible: The definitive source for all things dog.* Irvine, CA: BowTie Press.

Miller, Lucinda B. and H. Marie Suthers-McCable. 2002. *4-H PetPALS, people and animals linking successfully* (4-H 230GPM). Columbus, OH: The Ohio State University Extension.

Miller, Lucinda B. and R. Warren Flood, Susan Crank, Beth Corbin, and Judy Conrad. 1998. *Dog learning laboratory kit: Educator's resource materials set.* Columbus, OH: The Ohio State University.

Miller, Pat. 2001. *The power of positive dog training.* NY: Howell Book House.

Pet Partners. petpartners.org.

Pilot Dogs, Inc. *History of pilot dogs.* pilotdogs.org.

Rugaas, Turid. 1997. *On talking terms with dogs: Calming signals.* Carlsborg, WA: Legacy by Mail, Inc.

Tails-U-Win® Canine Training Center. *Positive training with positive results.* tailsuwin.com.

The American Society for the Prevention of Cruelty to Animals® (ASPCA). aspca.org.

Chapter 2
Breeds

The **American Kennel Club,** also known as the AKC, is the largest of the dog recording organizations in the United States. Its mission, in part, is "to advocate for the purebred dog as a family companion, advance canine health and well-being, work to protect the rights of all dog owners, and promote responsible dog ownership." As of January 1, 2017, AKC recognizes 189 breeds of dogs that are eligible to compete in AKC events. A total of 263 breeds are recognized by AKC across the seven dog groups, Miscellaneous Class and Foundation Stock Service®. To keep updated on recognized breeds go to the AKC website at **akc.org**. These breeds have been placed in seven groups according to their purpose. The groups are sporting, hound, working, terrier, toy, non-sporting, and herding. Knowing the purpose behind the development of a breed gives you an idea of the breed's characteristics and personality traits.

Herding Group

Courtesy of Curriculum Materials Service, The Ohio State University.

The German Shepherd Dog was founded by Captain Max von Stephanitz at the end of the 19th century, as a result of a breeding program to produce strong and agile sheep herding dogs. Today they serve a variety of purposes, among which are as guide dogs for the blind and for police work.

The herding breeds were developed to assist humans in the herding of various species of livestock. Members of this group are typically quite intelligent and highly trainable, making them excellent companions.

Courtesy of Curriculum Materials Service, The Ohio State University.

Shetland Sheepdogs originated in the Shetland Islands of Scotland. These intelligent and agile dogs make excellent obedience and agility companions.

Herding Group	
Australian Cattle Dog	Entlebucher Mountain Dog
Australian Shepherd	Finnish Lapphund
Bearded Collie	German Shepherd Dog
Beauceron	Icelandic Sheepdog
Belgian Malinois	Miniature American Shepherd
Belgian Sheepdog	Norwegian Buhund
Belgian Tervuren	Old English Sheepdog
Bergamasco	Pembroke Welsh Corgi
Berger Picard	Polish Lowland Sheepdog
Border Collie	Puli
Bouvier des Flandres	Pumi
Briard	Pyrenean Shepherd
Canaan Dog	Shetland Sheepdog
Cardigan Welsh Corgi	Spanish Water Dog
Collie	Swedish Vallhund

JUNIORS

Hound Group

Courtesy of Curriculum Materials Service, The Ohio State University.

Beagles were bred to hunt rabbits. These gentle dogs with soft brown eyes are great companions, hunters, and detection dogs, such as the beagles of the Beagle Brigade.

The hound breeds are a diverse group with the common ancestral trait of being used for hunting. Endurance, keen vision, and speed describe members of this group. Coursing or sight hounds hunt using speed and sight. Tracking or scent hounds, including the rather small Beagle and the large Bloodhound, trail by scent with diligence and patience.

Courtesy of Curriculum Materials Service, The Ohio State University.

Dachshunds were originally bred to scent and flush out badgers. The German name for Dachshund translates as "badger dog."

Hound Group	
Afghan Hound	Ibizan Hound
American English Coonhound	Irish Wolfhound
American Foxhound	Norwegian Elkhound
Basenji	Otterhound
Basset Hound	Petit Basset Griffon Vendeen
Beagle	Pharaoh Hound
Black and Tan Coonhound	Plott
Bloodhound	Portugese Podengo Pepueno
Bluetick Coonhound	Redbone Coonhound
Borzoi	Rhodesian Ridgeback
Cirneco Dell'etna	Saluki
Dachshund	Scottish Deerhound
English Foxhound	Sloughi
Greyhound	Treeing Walker Coonhound
Harrier	Whippet

Non-Sporting Group

Courtesy of Curriculum Materials Service, The Ohio State University.

The Standard Poodle originated as a water retriever supposedly from Germany, but it is regarded as the national dog of France. The Standard Poodle is the oldest of the three poodle varieties.

The non-sporting breeds vary a great deal in their historical and physical characteristics. They also vary greatly in disposition and size. Although they were developed to perform certain purposes, today they serve chiefly as pets.

Courtesy of Curriculum Materials Service, The Ohio State University.

Bulldogs originated in the British Isles. They got their name because they were used in bullbaiting, which required extreme courage and ferocity.

Non-Sporting Group	
American Eskimo Dog	Keeshond
Bichon Frise	Lhasa Apso
Boston Terrier	Lowchen
Bulldog	Norwegian Lundehund
Chinese Shar-Pei	Poodle (Standard and Miniature)
Chow Chow	Schipperke
Coton de Tulear	Shiba Inu
Dalmatian	Tibetan Spaniel
Finnish Spitz	Tibetan Terrier
French Bulldog	Xoloitzcuintli

Sporting Group

Courtesy of Curriculum Materials Service, The Ohio State University.

Labrador Retrievers were originally used to go over the side of fishing boats in their native Newfoundland, Canada, and drag the ends of the nets full of fish to shore.

The sporting breeds include pointers, setters, retrievers, and spaniels. The pointers and setters are hunters that cover the ground with great speed, freezing like statues at the scent of game birds. The retrievers are expert swimmers and excel at retrieving game in the field or in water. Briars do not grow too thick to keep the hard-working spaniel from flushing his game.

Courtesy of Curriculum Materials Service, The Ohio State University.

Golden Retrievers are popular as companions, family dogs, and working dogs because of their amiable temperament, willingness, trainability, useful size, and sturdy physique.

Sporting Group	
American Water Spaniel	Gordon Setter
Boykin Spaniel	Irish Red and White Setter
Brittany	Irish Setter
Chesapeake Bay Retriever	Irish Water Spaniel
Clumber Spaniel	Labrador Retriever
Cocker Spaniel	Lagotto Romagnolo
Curly-Coated Retriever	Nova Scotia Duck Tolling
English Cocker Spaniel	Pointer
English Setter	Spinone Italiano
English Springer Spaniel	Sussex Spaniel
Field Spaniel	Vizsla
Flat-Coated Retriever	Weimaraner
German Shorthaired Pointer	Welsh Springer Spaniel
German Wirehaired Pointer	Wirehaired Pointing Griffon
Golden Retriever	Wirehaired Vizsla

JUNIORS

Terrier Group

The terrier breeds are alert, bold dogs named after the Latin word *terra,* meaning earth, into which they follow their quarry. The terrier was developed to dig out small animals chased underground by tracking hounds. Many are small and can burrow through tunnels with ease. These feisty, energetic dogs are ferocious fighters once they corner their prey.

Courtesy of Curriculum Materials Service, The Ohio State University.

Originating from Germany, Miniature Schnauzers are derived from the Standard Schnauzer by crossing Affenpinschers and Poodles with small Standard Schnauzers.

Courtesy of Curriculum Materials Service, The Ohio State University.

The West Highland White Terrier originated from Scotland, and was bred for tracking and hunting. Westies are very hardy dogs, need little pampering, and are always on the go.

Terrier Group	
Airedale Terrier	Miniature Schnauzer
American Hairless Terrier	Norfolk Terrier
American Staffordshire Terrier	Norwich Terrier
Australian Terrier	Parson Russell Terrier
Bedlington Terrier	Rat Terrier
Border Terrier	Russell Terrier
Bull Terrier	Scottish Terrier
Cairn Terrier	Sealyham Terrier
Cesky Terner	Skye Terrier
Dandie Dinmont Terrier	Smooth Fox Terrier
Glen of Imaal Terrier	Soft Coated Wheaten Terrier
Irish Terrier	Staffordshire Bull Terrier
Kerry Blue Terrier	Welsh Terrier
Lakeland Terrier	West Highland White Terrier
Manchester Terrier (Standard)	Wire Fox Terrier
Miniature Bull Terrier	

Toy Group

Courtesy of Curriculum Materials Service, The Ohio State University.

Yorkshire Terriers originated in England in the 19th century. The breed traces back to the Waterside Terrier brought to Yorkshire by the Scottish weavers.

The toy breeds are the smallest of all breeds. They were developed to provide pleasure and companionship to their owners. Many of the breeds were prized by the royalty of ancient times. Although they are small in size, they are spirited and long-lived.

Courtesy of Curriculum Materials Service, The Ohio State University.

In the mid-seventeenth century, dogs resembling a lion, as represented in Asian art, were introduced into China. These were the ancestors of the modern-day Shih Tzu. The word *Shih Tzu* means "lion."

Toy Group	
Affenpinscher	Miniature Pinscher
Brussels Griffon	Papillon
Cavalier King Charles Spaniel	Pekingese
Chihuahua	Pomeranian
Chinese Crested	Poodle (Toy)
English Toy Spaniel	Pug
Havanese	Shih Tzu
Italian Greyhound	Silky Terrier
Japanese Chin	Toy Fox Terrier
Maltese	Yorkshire Terrier
Manchester Terrier (Toy)	

Working Group

Courtesy of Curriculum Materials Service, The Ohio State University.

The Boxer originated from Germany, developed from the Bullenbeisser (bull biters), which was an ancient mastiff breed once used to run down, catch, and hold wild boar, bear, and bison.

The working breeds were developed for serving humans by pulling sleds and carts, performing water rescues, and guarding property, including livestock. Members of this group are large and strong and make reliable companions.

Courtesy of Curriculum Materials Service, The Ohio State University.

As descendants of the Roman drover dog, Rottweilers drove cattle until the middle of the 19th century, at which time cattle driving was outlawed. The breed almost became extinct until its popularity grew as a police and military dog.

JUNIORS

Working Group	
Akita	Great Pyrenees
Alaskan Malamute	Greater Swiss Mountain Dog
Anatolian Shepherd Dog	Komondor
Bernese Mountain Dog	Kuvasz
Black Russian Terrier	Leonberger
Boerboel	Mastiff
Boxer	Neapolitan Mastiff
Bullmastiff	Newfoundland
Cane Corso	Portuguese Water Dog
Chinook	Rottweiler
Doberman Pinscher	Samoyed
Dogue de Bordeaux	Siberian Husky
German Pinscher	Standard Schnauzer
Giant Schnauzer	St. Bernard
Great Dane	Tibetan Mastiff

Miscellaneous Class	
Azawakh	Nederlandse Kooikerhondje
Belgian Laekenois	Norrbottenspets
Dogo Argentino	Peruvian Inca Orchid
Grand Basset Griffon Vendeen	Portuguese Podengo

Miscellaneous Class

Breeds eligible to participate in the Miscellaneous Class are also enrolled in the AKC Foundation Stock Service® (FSS®). The FSS® is an optional record-keeping service for all purebred breeds not currently permitted to be registered with the American Kennel Club. FSS® enrollment is maintained until the breed is accepted for regular status by the AKC Board of Directors. Breeds are admitted to the Miscellaneous Class when the AKC Board of Directors is convinced there is clear proof that a substantial, sustained nationwide interest and activity in the breed exists. Breeds in the Miscellaneous Class may compete and earn titles in companion events and select performance events. They are also eligible to compete in junior showmanship. Miscellaneous Class breeds may compete at conformation shows in the Miscellaneous Class and are not eligible for championship points. Provided the Miscellaneous Class breeds meet the expectations and standards of the AKC, they eventually become members of one of the seven recognized groups. Check **akc.org** for an up-to-date list of all dog breed groups.

Chapter 17
Nutrition and Exercise

Nutrition

Feeding your dog an appropriate high-quality diet is essential for maintaining his health. Poorly fed dogs lack the energy and stamina to keep up with an active training program, are more likely to suffer skin and coat problems, and are more susceptible to illness and the effects of stress.

Dogs should be fed complete and balanced commercial diets that are guaranteed to contain the nutrients they need. Dogs are best fed meat-based foods. Feeding table scraps or unbalanced homemade diets increases the likelihood of nutrient deficiencies or excesses that may be hazardous to the animal's health.

Choosing the right diet involves considering the dog's life stage, lifestyle, and body condition. Immature animals need foods that provide ample calories, protein, and minerals to fuel their growth. Because younger dogs have more limited gut volume, their foods must contain a high concentration of nutrients in each feeding.

Adult dogs generally need less concentrated nutrition, unless they are stressed, working, pregnant, or nursing. Each of these conditions increases nutrient needs and is best addressed by feeding a diet formulated with those special needs in mind.

Older dogs, like older humans, have special nutritional considerations that result from the effects of aging. They may have problems maintaining muscle mass and desired body weight, may be more picky eaters or have trouble eating, and may be more likely to develop certain diseases. When a dog approaches his golden years, it's a good idea to reassess the diet choice and make sure what's being fed is adequate to support continued good health.

Animals that are too thin should be fed diets that supply extra calories until ideal body weight is reached. Conversely, animals that are overweight should be fed fewer calories. A veterinarian should evaluate any animal that has problems maintaining appropriate body condition.

Making sure your dog is eating an appropriate high-quality diet is a critical step in keeping him healthy, happy, and able to play and perform. Proper feeding is evident in a glossy coat, strong muscles, firm stools, and an alert, ready attitude.

Body Condition Scoring (BCS)

Body condition scoring (BCS) is a way to standardize the assessment of whether dogs are underweight or overweight. Body condition scoring helps determine if a dog's growth rate and feeding amounts are correct to help prevent obesity. BCS is also used to ensure a dog is gaining the amount of weight he should be for his age, breed characteristics, and activity level.

Body condition scoring is useful as it allows veterinarians and dog owners to have a common understanding of a dog's weight. It can be used to suggest a target weight for a dog, allowing for the target weight to be customized for that specific dog rather than just suggesting a breed average, as there are a range of shapes and sizes within individual breeds. BCS is also used to define dogs at risk. There are several diseases dogs can get where risk or severity is worsened if the dog is obese.

Refer to the Body Condition Scoring Chart to help determine your dog's BCS.

Nutrients

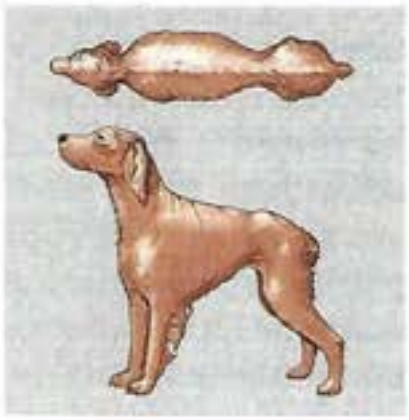
A **nutrient** is a substance that nourishes the metabolic processes of the body. Nutrients for dogs are grouped in six categories: water, carbohydrates, fats, protein, vitamins, and minerals.

INTERMEDIATE

Body Condition Scoring Chart

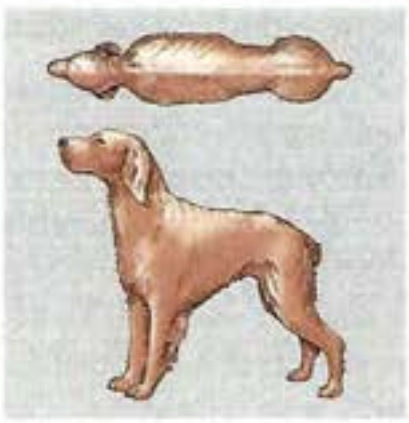
1 = Emaciated

Ribs, lumbar vertebrae, pelvic bones, and all body prominences evident from a distance. No discernible body fat. Obvious absence of muscle mass.



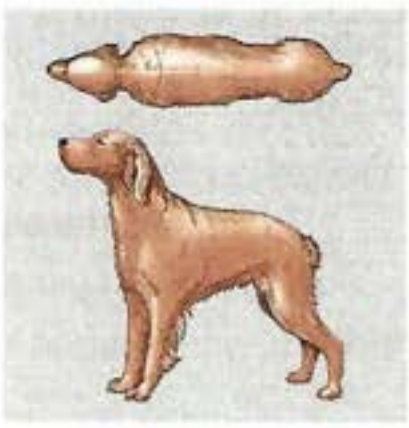
2 = Thin

Ribs easily palpated and may be visible with no palpable fat. Tops of lumbar vertebrae visible. Pelvic bones less prominent. Obvious waist and abdominal tuck.



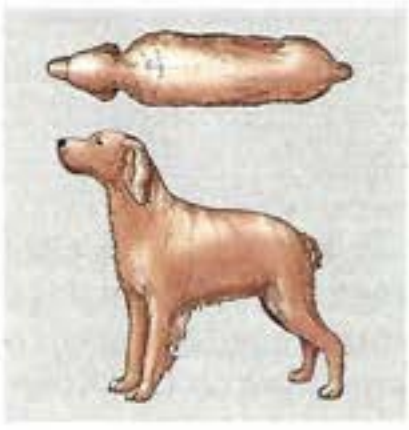
3 = Moderate

Ribs palpable without excess fat covering. Abdomen tucked up when viewed from side.



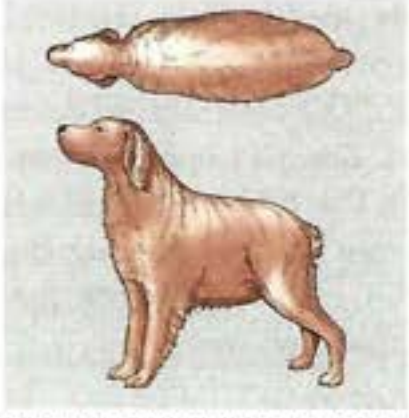
4 = Stout

General fleshy appearance. Ribs palpable with difficulty. Noticeable fat deposits over lumbar spine and tail base. Abdominal tuck may be absent.



5 = Obese

Large fat deposits over chest, spine, and tail base. Waist and abdominal tuck absent. Fat deposits on neck and limbs. Abdomen distended.



Tony Buffington, The Ohio State University, College of Veterinary Medicine.

Questions To Help With Body Condition Scoring

- What are the signs of an overweight dog?
- Is it difficult to feel his ribs or spine?
- Is it difficult to see your dog's waist?
- Is his abdomen sagging?
- Does his face look more round with larger cheeks?
- Does he often appear tired and lazy?
- Does he lag behind on walks?
- Does he pant constantly?
- Does he need help getting in the car?
- Does he resist playing games?
- Does he bark without getting up?

While any of these questions in isolation may not necessarily indicate that your dog is overweight, the questions as a whole can help you look at your total dog to make that determination. When unsure, consult with your veterinarian, who can help you adjust the amount of food you are offering as well as determine an appropriate exercise program to help your dog achieve an optimal BCS.

Water

Water is often referred to as the most important nutrient. Water is essential for the functioning of normal body processes, regulating body temperature, and for proper utilization and absorption of nutrients. Dogs die faster from lack of water than from the lack of any other dietary substance.

On average, normal adult dogs require about one ounce of water per pound of body weight per day to maintain good health. What and how much a dog eats, humidity, temperature, exercise and work, growth, gestation, and lactation all play a part in how much water a dog drinks daily. Dogs that eat canned diets normally drink less water than dogs that eat dry diets.

Carbohydrates

The main function of carbohydrates is to provide the dog with energy. Carbohydrates are necessary for the metabolism of other nutrients. They supply the cells with glucose, which is the normal source of energy used by cells in the body. Simple carbohydrates, such as sugars and starches, are quickly converted to glucose, providing the dog with immediate energy. Sources of carbohydrates are sugars, starches, and dietary fiber. Simple sugars are the least complex and most easily digested and absorbed. Starches are complex carbohydrates, which require more digestion before they can be absorbed into the bloodstream. Dietary fibers are not digestible by dogs.

Cereal grains make up a large portion of carbohydrates in dog food. Processing cereal grains by cooking, toasting, or baking improves palatability and digestibility.

Fats

Dietary fats are concentrated sources of energy. They are sources of essential fatty acids and fat-soluble vitamins. The addition of fat in the diet enhances palatability of the feed and adds a desired texture to foods. One gram of fat provides 2.25 times more calories than one gram of carbohydrate, and almost twice as many calories as one gram of protein. Therefore, too much dietary fat may cause obesity.

Protein

Protein is the most expensive major ingredient in dog food. It serves many functions in the body including the growth and production of muscles, bone and cartilage, skin, hormones, and enzymes. It also helps repair tissue, transport oxygen in the blood, and supply energy. Amino acids are the building blocks that make up protein. Essential amino acids are those that cannot be formed fast enough or in adequate amounts to meet the dog's requirements for growth and maintenance, and therefore must be provided in their diet.

Protein originates from both animal and plant sources. Protein quality or biological value (ability of the protein to be used by the body and its amount of usable amino acids) varies depending on its source. Egg has the highest biological value (100) and sets the standards for which other proteins are judged. Meat, bone meal, and wheat have a biological value of around 50, and corn is 45. Hair, feathers, etc., are very high in protein but very low for biological value.

Must-Have Amino Acids

Essential amino acids required for dogs are listed below:

Arginine	Lysine	Phenylalanine
Histidine	Methionine	Tryptophan
Isoleucine	Threonine	Valine
Leucine		

Protein requirements vary from breed to breed. Large breed dogs may have special protein needs. Protein requirements also vary depending on the growth and reproductive stages of dogs, as well as on their activity level, age, and health. If a healthy dog eats too much protein, some of it will be excreted in the urine, and the rest is used as calories or is converted to fat. Theoretically, it should not cause any harm. On the other hand, if a dog has kidney problems, he may need to be fed a protein-restricted diet, making a protein with a high biological value necessary.

Vitamins

Vitamins are organic compounds essential for growth, tissue maintenance, and metabolism. They must be provided in the diet because they cannot be synthesized by the animal. Vitamins are required in small quantities compared to other groups of nutrients; however, vitamin deficiencies can cause serious health problems. The fat-soluble vitamins are A, D, E, and K. Water-soluble vitamins are the B complex vitamins (Thiamin–B1, Riboflavin–B2, Niacin, Pyridoxine–B6, Biotin, Choline, Folic Acid, Vitamin B12) and Vitamin C.

Minerals

Minerals aid in bodily functions such as normal muscle and nerve function, hormone production, transportation of oxygen in the blood, bone and cartilage formation, maintaining fluid balance, and enzymatic reactions. Minerals are usually divided into two categories: macro-minerals and micro-minerals. Macro-minerals are required in larger amounts in the diet and are found in greater amounts in the body than micro-minerals. Micro-minerals are required in smaller amounts in the diet and are found in smaller amounts in the body.

Must-Have Minerals

Macro-minerals include	Micro-minerals include
Calcium (Ca)	Iron (Fe)
Phosphorus (P)	Zinc (Zn)
Sodium (Na)	Copper (Cu)
Potassium (K)	Manganese (Mn)
Magnesium (Mg)	Selenium (Se)
Chloride (Cl)	Iodine (I)

Types of Dog Food

Feed your dog a high-quality, commercially prepared dog food. Dog food comes in three forms: dry, semi-moist, and canned.

Dry dog foods typically contain 10% to 12% moisture. Some advantages of dry foods are (1) they are less expensive (usually the larger the bag, the lower the price per pound), (2) the hard texture helps clean the tartar from their teeth, and (3) they may be fed free choice. Some disadvantages include (1) lower palatability for many dogs, (2) the use of fresh animal tissues is limited due to the requirement for stability in drying, and (3) they are generally higher in fiber and lower in digestibility when compared to canned foods.

Semi-moist foods contain 25% to 35% moisture. Advantages to feeding semi-moist foods include (1) they do not require refrigeration, (2) they can be fed free choice, (3) they are highly palatable due to the sugar content and soft texture, (4) fresh animal tissues can be used in these foods. Disadvantages include (1) they often contain high amounts of sugar, which, in addition to causing tooth decay and making your dog fat, can stress the pancreas and adrenal glands, increasing the potential for diabetes, (2) they cost more than dry foods, (3) they do not clean tartar from teeth, and (4) they may contain unnecessary or even harmful food dyes and other nonessential ingredients.

Canned foods contain about 70% to 75% moisture. One advantage of canned foods is that a variety of wet and dry ingredients can be used. Generally, canned foods have the highest concentrations of fat and protein. Disadvantages include (1) they are usually the most expensive on a per-feeding basis, and (2) they do not clean tartar from teeth. Make sure when feeding "gourmet" foods that they are a complete balanced diet—many are not and should be fed only as supplements.

Reading Dog Food Labels

Providing your dog a high-quality diet is part of being a responsible dog owner. Learn to read dog food labels to determine what kind of food to feed and the quality of food you are feeding, and to ensure you are getting the desired product.

Dog food labeling is regulated at two levels: federal and state. The federal regulations establish standards for all animal feeds and include (1) proper identification of product, (2) net quantity statement, (3) manufacturer's address, and (4) proper listing of ingredients.

These federal regulations are enforced by the U.S. Food and Drug Administration's Center for Veterinary Medicine. Many states enforce their own labeling regulations, having adopted standards for pet food regulations established by the Association of American Feed Control Officials (AAFCO). These regulations are more specific, covering aspects of labeling including (1) product name, (2) guaranteed analysis, (3) nutritional adequacy statement, (4) feeding directions, and (5) calorie statements.

Association of American Feed Control Officials (AAFCO)

The Association of American Feed Control Officials (AAFCO) is not a government agency. However, it does operate within the guidelines of federal and state legislation, including laws governed by the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA). AAFCO establishes models or standards for regulations designed to guarantee manufacturers provide clear, accurate, and consistent information about animal feed, including pet food. The AAFCO statement listed on a dog food label is a nutritional adequacy claim by the pet food manufacturer that identifies for which life stage and/or lifestyle the product has been approved.

AAFCO labeling regulations are very specific, helping animal owners select appropriate feed.

Product Name. The product name is the most noticeable part of the label. Manufacturers typically use the product to emphasize main ingredients, such as "xxx Brand Lamb Meal and Rice Formula." Four AAFCO rules dictate the percentages of named ingredients in the total product:

1. **The "95% Rule."** This applies to products consisting mainly of meat, poultry, or fish, such as many canned foods. For example, if a label says "Lamb for Dogs," at least 95% of the product must be the named ingredient, i.e., lamb. This does not count the water added for processing and remaining ingredients. When counting the added water, the main ingredient, i.e., lamb, must still comprise 70% of the product. In this example, lamb should be the first ingredient listed in the ingredient list. This rule applies only to ingredients of animal origin.
2. **The "25% or Dinner Rule."** This rule applies to many canned and dry products. If the named ingredients include at least 25% of the product, e.g., lamb, not counting the water for processing, but less than 95%, the product name must include a qualifying descriptive term such as **Lamb Dinner for Dogs**. Other descriptors such as **formula**, **nuggets**, **entrée**, etc., are also used. In this example, only one-fourth of the product must be lamb, so lamb would probably be found third or fourth on the ingredient list. Be aware that the main ingredient is not always the "named" ingredient and may be an undesirable ingredient for the type of diet you wish to feed your dog. If more than one ingredient is included in the name, such as "Lamb Meal and Rice Formula for Dogs," then both ingredients combined must total 25% and be listed in the same order as found on the ingredient list. This 25% rule applies to all ingredients.
3. **The "3% or With Rule."** If a label says "Dog Food with Lamb," the food needs to contain only 3% lamb. (This is very different from the "Lamb Dog Food," above, which must contain 95% lamb.) A sidebar on the label may say "with cheese," for example, provided at least 3% cheese is present. The 3% rule allows manufacturers to point out the presence of minor ingredients that were not added sufficiently to warrant a "dinner" claim.
4. **The "Flavor Rule."** While a specific percentage of an ingredient is not required under the "flavor" rule, a product must contain an amount sufficient to be detected. For example, if the product name says "Lamb Flavor Dog Food," the word "flavor" must appear on the label in the same size, style, and color as the word "lamb." The corresponding ingredient may be lamb, but typically it is another substance that gives the characterizing flavor, such as lamb meal or lamb by-products.

Net Quantity Statement. This tells you how much product is in the container of dog food. It is important to compare the cost per ounce or cost per pound between products, as a 14-ounce can of dog food may look identical in size to a 16-ounce (1 pound) can of dog food sitting beside it.

Manufacturer's Name and Address. The "manufactured by ..." statement identifies the party responsible for the quality and safety of the product and its location. If the label says "manufactured for ..." or "distributed by ...," the food was manufactured by a third party, not the name on the label. However, the name on the label still indicates the responsible party. An address, phone number, and/or e-mail address should be listed so customers can easily obtain product information.

Ingredient List. Ingredients are required to be listed in order of predominance by weight (largest quantity by weight listed first). However, the weight includes the moisture in the ingredient, which makes it tricky to interpret. It can be hard to compare the order rankings of different diets due to differences in moisture contents of the individual ingredients within the diets. Also, separate ingredients may outweigh other ingredients listed before them. For example, chicken might be listed as the first ingredient, followed by ground corn, corn gluten, corn bran, wheat flour, ground wheat, and so on. Even though chicken is listed as the main ingredient, the three corn products together may weigh more than the chicken, making the main ingredient corn. Grains are not as digestible as meat sources of protein and add greatly to the carbohydrate load. Ingredients must be listed by their common or usual name. As you read further down the ingredient list, you will read the names of vitamins, minerals, and other nutrients found in the food. Other ingredients may include artificial colors, stabilizers, and preservatives.

Guaranteed Analysis. The guaranteed analysis lists the minimum levels of crude protein and crude fat, and the maximum levels of crude fiber and moisture. Minimum levels may be listed as "not less than," "min," or "% min," and maximum levels may be listed as "not more than," "max," or "% max." These percentages are minimums and maximums only and may not reflect the actual amount of nutrient included in the diet. For example, a diet that lists a minimum crude protein of 25% should contain at least 25% protein, but could contain much more. Crude protein (% min), crude fat (% min), crude fiber (% max), and moisture (% max) must be included on all pet food labels. Other information, such as minimum percentage levels of certain vitamins, minerals, and other nutrients are found on some product labels. The guaranteed analysis is an important tool when starting to compare dog food diets. However, it does not provide meaningful nutritional information for these reasons: (1) only minimum and maximum percentages are listed; (2) crude percentages do not equate to the actual digestible quantities of nutrients in the food; and (3) the digestibility of protein and fat can vary widely depending on their sources. The amount of moisture present in the diet is another factor in determining actual protein and fat percentages. To make meaningful comparisons of nutrient levels between a canned and a dry food, they should be expressed on a similar moisture basis. To roughly estimate this, the guarantees for the canned product should be multiplied by four, because the amount of dry matter in the dry food is about four times the amount in a canned product.

Nutritional Adequacy Statement. This is the AAFCO statement. Dog foods must provide complete and balanced nutrition to meet the AAFCO standards. These foods must be substantiated for nutritional adequacy in one of two ways: (1) They must contain ingredients formulated to provide levels of nutrients that meet an established profile. Products that meet these requirements say, "ABC Brand is formulated to meet the nutritional levels established by the AAFCO Dog Food Nutrient Profiles;" (2) The product must be tested following the AAFCO Feeding Trial Protocols. Products meeting these requirements say, "Animal feeding tests using AAFCO procedures substantiate that ABC Brand provides complete and balanced nutrition."

Feeding Directions. These feeding instructions or guidelines tell you the recommended amount to feed your dog based on his growth level, weight, and age. The instructions typi-

cally say to "feed X cups per X pounds of body weight daily." Feeding guidelines tend to overestimate feeding requirements more often than underestimate them. You need to determine the amount of feed that is best for your dog depending on his breed, age, temperament, activity level, weight, and so forth. The amount listed in the feeding guidelines should be divided by the number of times a day you feed your dog.

Calorie Statement. Calorie statements are voluntary and are not required by the manufacturer. If a calorie statement is made, it must be expressed on a "kilocalories per kilogram" basis. Kilocalories are the same as the calories we see on human food labels. A "kilogram" is a unit of metric measurement equal to 2.2 pounds. To roughly compare the caloric content values of a canned versus a dry food, multiply the value for the canned food by four.

Manufacturing and "Best Used By" Codes. Manufacturing codes allow the company to track the product for quality and inventory issues. If you contact the company with questions, the customer service representative will usually ask you for this code. Expiration or "Best Used By" dates are optional, but are helpful in determining product freshness and shelf life.

Source: U.S. Food and Drug Administration Center for Veterinary Medicine, Interpreting Pet Food Labels, David A. Dzanis, DVM, Ph.D., DACVN.

How Much to Feed

How much do you feed a dog? You are in control of what and how much your dog eats. You can (1) feed him free choice, that is, make food freely available (also referred to as *ad libitum*), (2) limit the amount of time he is given to eat, or (3) limit the amount of food he gets. If you choose to limit the amount of time given to eat, feed what he can clean up in 15 to 20 minutes either once or preferably twice daily. Usually restricting the amount of food he eats gets the best results. This allows you to measure each feeding, and then adjust accordingly to maintain his ideal weight. You may need to adjust the amount you feed from the amounts suggested on dog food labels, because they are frequently too high.

Feed enough food so your dog maintains an ideal weight. The ribs should be easily felt without being able to stick your fingers between them. There should be a definite "waistline." It is healthier for your dog to be a little lean than it is for him to be too fat. Refer to the Body Condition Scoring section of this publication.

How Often to Feed

Puppies need to eat more often than adult dogs; feeding puppies three times a day is recommended. Caution should be taken in feeding large breed puppies since rapid growth has been a proven contributor to bone and joint disorders, such as hip dysplasia. These puppies need to be kept lean but still fed a high-quality food. As the puppy ages, he normally stops eating much at his noon meal. At that point, that meal can be eliminated. When your dog reaches a year of age, he can be put on adult food and can be fed either once or twice a day. Many behaviorists and nutritionists recommend feeding a dog twice a day for his entire life.

Foods to Avoid

There are several foods you need to make sure your dog does not eat. One of these is chocolate. It contains an ingredient called *theobromine* that interferes with a dog's heart function. How deadly it is depends on the size and age of the dog, as well as the concentration and amount of chocolate eaten. Dark chocolate is much worse than milk chocolate. If you catch your dog shortly after he has eaten the chocolate, give him hydrogen peroxide to induce vomiting (as described in Chapter 16, Health). Otherwise, contact your veterinarian for instructions.

Dogs should not be fed raw eggs, raw onions, uncooked starches, grapes, and raisins. Raw egg whites bind up biotin, causing the dog to become deficient in that vitamin, and raw onions have been linked to liver damage in dogs. Uncooked starch that can be found in potatoes, oatmeal, and other cereals can cause diarrhea. Grapes and raisins contain a toxin that can damage a dog's kidneys, leading to renal failure and death. Eating even as few as seven may result in toxicity. Sugar-free products, such as sugar-free gum containing Xylitol, may cause severe hypoglycemia and possible liver failure in dogs, resulting in death.

INTERMEDIATE

Your dog should NOT eat these foods:

- Chocolate
- Raw eggs
- Raw onions
- Uncooked starches like those found in potatoes, oatmeal, and other cereals
- Grapes
- Raisins
- Sugar-free products

Avocados contain a toxin called persin, which, contrary to belief, is generally not poisonous to dogs. However, the risk when eating avocados is a foreign body obstruction, which can happen if the dog swallows the whole, large, round avocado seed. It can get stuck in a dog's esophagus, stomach, or intestinal tract.

Bones are another item that can cause serious problems in dogs. According to the FDA Center for Veterinary Medicine (CVM), allowing dogs to chew on bones is a dangerous practice. Bones are unsafe regardless of their size, and whether raw or cooked. The FDA CVM states 10 reasons why bones should not be fed to dogs: (1) They may cause broken teeth; (2) They may cause mouth or tongue injuries; (3) A bone can get looped around a dog's lower jaw; (4) Bone can get stuck in a dog's esophagus; (5) Bone can get stuck in a dog's windpipe; (6) Bone can get stuck in the stomach; (7) Bone can get stuck in intestines and cause a blockage; (8) Bone fragments may cause constipation; (9) Bones can cause severe bleeding from the rectum; and (10) Bones may cause peritonitis, a nasty, hard-to-treat bacterial infection of the abdomen caused when bone fragments puncture the dog's stomach or intestines. The FDA CVM recommends talking with your veterinarian about alternatives to giving bones to your dog, as there are many bone-like products available that are safe for dogs to chew on.

Treats

Dogs love treats and owners love to give treats to their dogs. Treats provide variety in a dog's diet. They are used as training aids to reinforce desired behaviors. Certain treats also promote dental health. Treats should be considered dietary supplements, and not as a replacement for nutritionally balanced dog food.

Ohio State University Extension.

Teach your dog to take his treat gently.

Exercise

Physical exercise is as important for your dog as it is for you, and for the same reasons. Exercise improves your dog's muscle tone, flexibility, cardiovascular fitness, and digestion. It strengthens your dog's immune system. Exercise also increases the production of endorphins, which are chemicals produced in the body that reduce stress, enhance moods, and help your dog to relax. Exercise has the same benefits for you, so use exercise to improve your health and the health of your dog *and* to build a relationship with your pet.

Ohio State University Extension.

Daily exercise and play are important for you and your dog.

Your dog should have a minimum of 20 minutes of planned exercise twice daily. To determine how much exercise to give your dog you need to consider his breed type, age, current overall health, and body condition. You also need to take into consideration how much unplanned exercise he is getting throughout the day. Puppies require short periods of exercise, while active breeds, such as the Border Collie, require more vigorous exercise and play time than do short-legged, long-bodied dogs like the Basset Hound and older dogs.

Just as in humans, the condition of the dog determines the level at which the dog can exercise. As your dog builds up stamina, he becomes capable of exercising for a longer period of time. Your dog needs to start exercising slowly for shorter periods of time until he gets into shape; then increase the time and rigor of his exercise program.

You also must pay attention to the weather, and not over-exercise your dog if it is too hot or cold. Brachycephalic breeds (short-nosed) such as the Bulldog, cannot handle heat and may have difficulty breathing if forced to run. The short-coated breeds, like a smooth-coated Dachshund, may not tolerate the cold. Just like people, dogs can suffer from heatstroke, frostbite, and hypothermia.

Know how your dog acts under normal conditions. Do not force your dog to continue exercising if he begins to limp, slows down, lags behind, pants excessively, or quits on his own.

The most common form of exercise is to take your dog for a walk. Jogging and hiking are also good ways to exercise your dog. Play fetch with your dog or take him for a swim. Let him play with other dogs under your supervision. You can also involve your dog in organized sports such as agility, tracking, herding trials, and so forth, to enjoy the sport of dogs and give your dog some exercise.

It is also important to exercise your dog before a training session. He is able to focus better after expending some of his energy.

Exercise helps keep your dog from getting bored. A bored dog can get into trouble.

Make sure that plenty of fresh water is available at all times. Never feed your dog before or immediately after an exercise session. Feeding too close to strenuous exercising can lead to bloat, a life-threatening condition.

Ohio State University Extension.

Keep your dog on a leash when taking him for a walk around town.

Chapter 16
Health

SENIOR

Understanding how your dog's body works, what health problems he could have, and how to take care of him is essential to his overall well-being. Learning about your dog's anatomy and physiology and about health problems common to his breed, or to the breed he most closely represents, gives you information that is useful should your dog become sick. Establish a relationship with your veterinarian so he or she knows you and your dog and is receptive to your questions and concerns. Establish a year-round wellness program to keep you and your pet safe from diseases and to keep your pet as healthy as possible.

Handle and examine your dog regularly to make your veterinarian's job easier.

What's Your VCPR?

The relationship you have with your veterinarian is called the veterinarian/client/patient relationship or VCPR. The better your VCPR, the better you and your veterinarian can ensure your animal's health and well-being. VCPR is often referred to in the animal sciences because it so directly affects animal care, animal welfare, and quality assurance. A VCPR requires your veterinarian has seen and has knowledge of your animal and has discussed a health plan and any treatments with you.

Wellness Program

Work together with your veterinarian to establish a year-round wellness program that goes beyond the annual physical examinations and associated vaccinations and medications. A wellness program involves continuous monitoring by you and periodic monitoring by your veterinarian for the purpose of developing preventive care strategies that enhance the health and welfare of your dog. These strategies should include the following:

- Active involvement with your veterinarian. Annual visits, or more frequently if recommended by your veterinarian, should be made to assess the physical and behavioral health and well-being of your dog, including regularly scheduled examinations and preventive care.

Ohio State University Extension.

Have your dog examined at least once a year by your veterinarian to make sure he is healthy.

- Wellness programs should include regular vaccinations; parasite prevention and control; selected screening for common diseases and conditions; behavioral evaluation; preventive medical, dental, nutritional, and behavioral care, including environmental enrichment; and an assessment of genetic health when appropriate.
- Wellness visits should include a thorough physical examination that assesses nutritional and oral health, screens for selected infectious and parasitic diseases, and evaluates general behavior.
- Dogs must be vaccinated for rabies in accordance with local and state ordinances or regulations. Other vaccinations should be given at appropriate intervals as deter-

mined by your veterinarian to be in the best interest of your dog and anyone your dog comes in contact with.

- Internal and external parasite prevention and control programs should be implemented in accordance with local risks and the life stage of the dog. Parasites that dogs can transmit to people include roundworms, hookworms, *cryptosporidia,* and *Giardia.* These parasites are usually associated with puppies.
- Maintain your dog's hair coat and nail quality through regular grooming, keeping in mind that excessive grooming or bathing, including the use of harsh products, may be harmful.
- Feed your dog a high-quality commercial diet that is designed for his stage of life. If you prepare homemade dog food, keep in mind that microwave cooking may not heat the meat sufficiently to kill organisms. Use a meat thermometer to make sure the meat reaches the correct temperature. Carefully prepared raw diets are also acceptable, but they are not complete and require preparation and supplemental vitamins, minerals, and other nutrients. When using raw foods, use extreme care in handling and preparing food to avoid contamination and infection.
- Provide plenty of clean, fresh water at all times. Bring water from home or buy bottled water to give your dog when traveling. Dogs should not drink unfamiliar water, which could give them diarrhea.

Ohio State University Extension.
When you travel make sure you carry water for your dog.

- Prevent your dog from hunting or eating other animals.
- *Practice regular hand washing.* This is the best way to prevent the transmission of diseases. Wash your hands after petting your dog, and don't pet your dog while you are eating.

A Healthy Dog

It is important to establish a close bond with your pet and to know how your pet acts under normal conditions when he is healthy. You can then recognize abnormal behaviors and detect illnesses early.

A healthy dog:

- Has a shiny hair coat free of bald areas. The hair is neither brittle nor dull. He does not scratch, dig, bite, lick, gnaw, or pull at his fur excessively.
- Is active and alert, aware of and interested in his surroundings, and appears happy.
- Has a good appetite and eats his food without trouble.
- Drinks water regularly, but not large amounts nor too often.
- Does not have bad breath.
- Has pink gums and tongue.

Ohio State University Extension.
Check your dog's gums and tongue to make sure they are pink. Pale gums and tongue may be a sign that your dog is anemic.

- Has clean eyes, without any ocular discharge. They are not red or inflamed.
- Does not continually scratch his ears or shake his head.

- Has clean ears, and no foul odor coming from the ear canal.
- Has a moist nose, with no nasal discharge.
- Does not limp or continually hold a foot up.
- Has a solid stool and defecates once or twice daily.
- Does not strain when urinating. The urine is free of blood.
- Has normal breathing.
- Does not continually cough or sneeze.
- Has a clean genital area, with the anus not matted or dirty.
- Has a normal body temperature of 100.5°F to 102.5°F.

Conversely, some signs of an unhealthy or sick dog might include:

- Change in mood
- Loss of appetite
- Lethargic, sluggish, depressed
- Pale gums and/or tongue
- Irritable
- Pink or red conjunctiva membranes, or inflamed eyes
- Nasal discharge
- Ocular (eye) discharge
- Constant scratching or digging at ears, or yelping when ears are touched
- Constant panting; rasping
- Increased drinking
- Difficulty getting up or lying down
- Diarrhea or change in color or consistency of stool
- Vomiting
- Trembling
- Coughing
- Restlessness
- Hiding
- Afraid of loud noises or bright lights
- Persistent bad breath
- Excessive drooling
- Loss of hair, open sores
- Noticeable weight gain or loss without a change in diet

Diseases Prevented by Vaccination

A vaccine is a preparation that contains an antigen consisting of killed or weakened disease-causing microorganisms (bacteria or viruses). Vaccines are used to prevent or treat infectious diseases by giving immunity against the disease caused by the microorganisms. A vaccine contains modified bacteria or viruses that do not cause the disease, but stimulate the body's immune system to manufacture protection against the disease. Vaccination is the process of injecting a vaccine into a dog.

Vaccination recommendations vary from state to state and from veterinarian to veterinarian. Consult with your veterinarian to determine which vaccinations your puppy or dog should receive, and how often they should be given. With the exception of the rabies vaccine, there is no solid research that says how long vaccination protection lasts. Core vaccinations include vaccines that should be given to all dogs who visit a veterinary clinic. Your veterinarian determines whether a vaccine for a particular disease is core by considering the severity of the disease, the geographic location, the risk of transmission to the dog, the potential for a certain infection to be zoonotic, and the performance of the vaccine. Examples of core vaccinations typically include distemper, canine adenovirus-2, canine parvovirus-2, and rabies.

Noncore vaccines are reserved for dogs with individual needs because their lifestyle represents a reasonable risk of infection. Examples of noncore vaccinations might include canine parainfluenza and *Bordetella bronchiseptica* (both cause kennel cough), leptospirosis, coronavirus, and *Borrelia burgdorferi* (causes Lyme disease).

One example of a timeline for vaccinating puppies is giving core vaccinations at 6 to 8 weeks of age, with booster shots given at 10 to 12 weeks and 14 to 16 weeks. Rabies vaccinations should be given to puppies at 16 to 26 weeks of age, followed by a booster shot at one year of age. Some states require one-year rabies vaccinations, while others require two-year or three-year rabies vaccinations. Again, consult with your veterinarian to determine the vac-

cination protocol to follow for each dog in your household.

The following sections contain information about selected diseases and their prevention.

Rabies

Rabies is a viral infection that attacks the central nervous system in all warm-blooded animals. The most common carriers are raccoons, followed by bats, skunks, and foxes. The infected animal salivates profusely because he cannot swallow. The virus is released from the salivary glands and can be transmitted to others by a bite or through an open wound. The disease attacks nerve tissues, resulting in paralysis and death. That is why preventive vaccination is a must.

Rabies is transmitted when the saliva from an infected animal comes into contact with another animal through a bite or open wound. Animals affected with rabies behave in an erratic manner. They appear dull or are very wild, frantic, or furious. They may appear weak, have seizures, drool, and have difficulty swallowing. Rabies affects the central nervous and respiratory systems.

A vaccination shot is usually given at 16 to 26 weeks of age, then again at one year old. Current recommendations on booster shots after that vary from state to state.

The rabies virus can be transmitted to humans when the saliva from an affected animal comes into contact with broken skin, such as a scratch or bite. Rabies is rare in humans today because of pets receiving vaccinations to prevent contracting the disease. Once the symptoms of rabies develop, the disease is fatal. If a person has been bitten by a domestic animal that does not have proof of a rabies vaccination, or by a wild animal, the bite should be cleansed with soap and water immediately, and then the person should seek medical attention. The incubation period for rabies varies greatly, and may take anywhere from a week to several months to appear. Once symptoms have developed, there is no treatment or cure. Preventative treatment can be given to suspected rabies cases and bite victims if it is administered before the first sign or symptom. Do not approach any domestic animal that is acting strangely or confused, and never approach a wild animal.

Coronavirus (CCV)

Canine **coronavirus** is a highly contagious viral infection specific to dogs. This virus reproduces inside the upper two-thirds of the small intestine, as well as local lymph nodes. A coronavirus infection by itself is typically considered to be a mild disease with sporadic symptoms, or none at all. However, if this infection occurs with parvovirus, or an infection caused by other intestinal pathogens, the outcomes can be very serious. Puppies are much more susceptible than adult dogs, and are at a higher risk of developing serious complications, and dying, with this virus. They can quickly become dehydrated as a result of vomiting and diarrhea, as well as develop severe enteritis (inflammation of the small intestine).

Initial symptoms may include depression and loss of appetite. Infected dogs will vomit and have diarrhea. The diarrhea is foul-smelling, varies from soft to watery, and is yellow-green or orange in color. Fever is uncommon.

Coronavirus is transmitted by exposure to feces or oral secretions from an infected dog. The virus can remain in the body and shed into the stool for as long as six months. A dog's susceptibility to coronavirus increases when exposed to unsanitary conditions, or as a result of stress caused by over-intensive training or overcrowding.

Treatment includes controlling vomiting and diarrhea, and keeping the dog hydrated. Although not commonly given, consult with your veterinarian about an available vaccine.

Distemper (CDV)

Distemper is a disease caused by a virus that attacks every tissue in a dog's body. The disease is contagious and can cause death.

Symptoms of distemper include discharges from the eyes (ocular discharges) and from the nose (nasal discharges) that become yellow and sticky. Fever, vomiting, coughing, and diarrhea are also symptoms. The dog may also show loss of appetite and depression. Severe cases progress to the central nervous system, causing

severe muscle twitching, seizures, and paralysis. There is little hope of recovery once distemper affects the central nervous system. Even if a dog does recover, he may continue to have jerking muscle contractions or seizures indefinitely.

The distemper vaccine is given as a core vaccination.

Hepatitis (Canine Adenovirus Type 1-CAV-1)

Canine hepatitis is a disease of the liver, kidneys, other body organs, and the central nervous system. It is caused by canine adenovirus type 1 (CAV-1). This virus is spread by body fluids, including urine and nasal discharge. The primary source of transmission is direct contact with an infected animal. Other modes of transmission are through contaminated food and water bowls, dog runs, crates, people's hands, boots, and so forth.

Hepatitis symptoms are high fever, depression, vomiting, respiratory disease, lack of appetite, and dehydration. Hepatitis is serious in young animals. Recovered animals may be affected with chronic illnesses or eye disease. This disease causes rapid death in young dogs. Older dogs take a long time to recover and are faced with a long convalescence. The resulting bluish tint to the eyes disappears very slowly. This CAV-1 virus **cannot** cause hepatitis in people.

The CAV-1 vaccine is one of the core vaccinations given to dogs.

Leptospirosis

Leptospirosis is a bacterial disease that infects both animals and humans. There are many different strains of the infecting organism, which is a spirochete. Vaccination against one strain does not protect against the other strains. Vaccines for dogs offer six to eight months of protection.

The disease is transmitted by contact with urine from an infected animal, including dogs, raccoons, squirrels, skunks, and cattle. It is also spread indirectly through exposure to contaminated water, food, and bedding.

Symptoms of leptospirosis include fever, refusal of food, weakness, muscle pain, bruising, vomiting, and increased thirst. Leptospirosis attacks the liver, kidneys, and central nervous system. It is expensive to treat. Recovered animals can act as carriers of this disease.

Some dogs have reactions to the leptospirosis vaccine, more so than to any other vaccination. Therefore, consult with your veterinarian to decide if this vaccine is needed for your dog.

Leptospirosis is a zoonotic disease. Specific strains of leptospirosis contagious to humans vary with locality. Most cases occur when the soil is moist and alkaline. Symptoms in humans include fever, headache, muscular aches, inflammation of the eyelids, and occasionally jaundice. If left untreated, it can cause kidney damage or liver failure. Prevention is by vaccination of the dog, sanitation of contaminated areas, and hand washing.

Parvovirus (CPV)

Parvovirus is a highly contagious viral disease caused by a pathogen called canine parvovirus (CPV) and variations of the original strain. It is transmitted through the feces or fluids of an infected dog, and is present in the feces for up to three weeks after infestation. The virus also lives on kennel floors, food and water bowls, boots, clothing, and other inanimate objects.

Puppies are very susceptible to parvovirus. The virus attacks the gastrointestinal tract of the dog and possibly the heart muscle. Symptoms include vomiting, diarrhea, bloody or dark stools, and dehydration. Fever, loss of appetite, and depression may also occur.

This disease progresses very quickly. Death can occur as early as two days after the onset of the disease, especially in young puppies. Prompt veterinary care is essential to increase an infected puppy's or dog's chance of survival.

Vaccines do not provide immediate immunity against a disease. Therefore, puppies and adult dogs have a window of susceptibility where they are at risk for getting the disease for a few days after receiving the vaccination. Once that period has passed, the vaccines effectively prevent parvovirus.

The parvovirus vaccine is one of the core vaccinations given to dogs.

Kennel Cough Complex (Acute Canine Infectious Tracheobronchitis)

Kennel cough, also known as *Bordetella*, is a highly contagious respiratory disease transmitted from an infected dog to a healthy dog much in the same way that human colds are spread. Kennel cough is caused by one or a combination of different agents, with the most common being the bacteria *Bordetella bronchiseptic,* and the viruses called parainfluenza virus and adenovirus. The Mycoplasma organism is also a common agent causing kennel cough. The major symptom of kennel cough is a harsh, hacking cough. It is often described as sounding like the dog has a bone caught in his throat. The dog also may gag and retch, coughing up thick, white foam. Appetite and temperature remain normal. Kennel cough usually runs its course in one to two weeks. The primary risk is for a secondary infection of bacterial pneumonia. Vaccination decreases the dog's chance of infection and reduces the severity.

Parainfluenza Virus (CPIV)

Canine parainfluenza virus (CPIV), a highly contagious respiratory virus, is considered the most common viral agent of acute canine infectious tracheobronchitis (kennel cough). This common virus will cause mild symptoms, which may include coughing, sneezing, runny eyes, low-grade fever, nasal discharge, lack of energy, and/or loss of appetite. CPIV is excreted from the respiratory tract of infected dogs for up to two weeks after infection, with symptoms typically lasting less than six days unless there is involvement of other bacteria, which is often the case. This virus is usually transmitted through the air, and spreads rapidly in kennels or shelters populated with large numbers of dogs. Most five-way vaccines and kennel cough vaccines offer some protection against CPIV. While CPIV and canine influenza have resembling respiratory symptoms, these viruses are unrelated and require different vaccines for protection.

Canine Influenza

Canine influenza, also known as "dog flu," is a contagious respiratory disease caused by an influenza A H3N8 influenza virus. A H3N8 influenza virus was originally an equine influenza virus that spread to dogs, but it now spreads between dogs. Canine influenza is a disease of dogs, with no evidence that this virus infects humans.

Signs of canine influenza can include coughing, sneezing, nasal discharge, and fever. Some dogs show no signs, while some have severe infections. About 80 percent of infected dogs have a mild form of the disease. Severe infections are characterized by the onset of hemorrhagic pneumonia. This virus can be spread to other dogs by direct contact with aerosolized respiratory secretions from infected dogs, by uninfected dogs coming into contact with contaminated objects, and by moving contaminated materials or objects between infected and uninfected dogs. Do not expose a dog showing signs of this virus to other dogs. Clean and disinfect hands, surfaces, clothing, and equipment after exposure to dogs showing signs of respiratory disease.

If this virus is suspected, a veterinarian can tell you if testing is appropriate to confirm the disease. Approved vaccines are available.

Lyme Disease

Lyme disease is transmitted by ticks infected with a type of bacteria called a spirochete. These ticks are carried by white-tailed deer.

Symptoms of Lyme disease in dogs usually appear two to 5 months after exposure, and include a fever between 103°F and 105°F, lameness, swelling of the joints, lethargy, and loss of appetite. Arthritis may result if the dog is not promptly diagnosed and treated. Dogs typically do not develop a rash or the ring-like lesion at the site of the bite as seen in humans.

Lyme disease in dogs is treated using several broad spectrum antibiotics. The earlier it is detected, the more successful the treatment. Prevention measures are accomplished by removing ticks before they attach or within 24 hours after they attach, as well as by using a flea and tick preventative. Vaccines are available for prevention of Lyme disease in dogs.

Humans can get Lyme disease by improperly removing an infected tick from a dog, or from

SENIOR

an infected tick leaving the dog and attaching itself to the person. Ticks infected with Lyme disease also can attach themselves to people. Symptoms of Lyme disease in humans include a red, ring-like lesion developing at the site of a tick bite within 2 to 32 days, tiredness, fever and chills, headache, muscle and/or joint pain, and swollen lymph glands. Diagnosis of Lyme disease can be difficult because tests are not necessarily accurate.

Internal Parasites

Internal parasites commonly found in dogs are roundworms, hookworms, whipworms, tapeworms, and heartworms. Giardia is also an internal parasite that sometimes infects dogs.

When you purchase a new pup or dog, take him and a small, fresh specimen of stool to your veterinarian. Ask your veterinarian for the best time to bring in the stool sample, because the life cycles of parasites determine when eggs are visible. The stool sample needs to be only the size of a marble. Take it to the vet in a piece of tin foil or put it in a small plastic sandwich bag. Your veterinarian will examine the stool sample using a microscope to determine if internal parasites are present. Then he or she will prescribe the amount and type of deworming **(anthelmintic)** medication needed.

These roundworm, hookworm, and whipworm eggs were found in the feces of one dog. To guard against these internal parasites, have your dog checked at least annually.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University

The medication used for worming dogs acts by either killing the worms or causing them to go into a stupor, which releases their hold and allows them to pass through in the stool.

Because of its potential toxicity, an overdose of worm medicine can be harmful to the dog. Worming when unnecessary can also be as harmful as not worming when needed. Always consult your veterinarian for proper medication.

If you have a bitch you are going to breed, she should be worm free before breeding. Otherwise, some of the internal parasites can be passed on to her puppies. Prevention is the best policy.

Roundworms

Roundworms, or ascarids, are the most common of the internal parasites. The species common to dogs is *Toxocara canis*. Signs of roundworm infections include vomiting, diarrhea, constipation, and a pot-belly appearance.

Eggs hatch in the intestines, enter the bloodstream as young embryos, and then migrate through all the body tissues. They eventually migrate back to the intestines where they develop to maturity, lay eggs, and start the cycle again. Adult ascarids look like thin spaghetti, are up to 7 inches long, and may be either vomited or passed in the stool.

Many puppies are born with roundworms. Treating bitches prior to, during, and after pregnancy, as prescribed by your veterinarian, prevents or reduces roundworm infestation.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University

Roundworm Eggs

Adult Roundworms

Roundworm eggs can be passed from dogs to humans through dirt and other environments. Children are especially susceptible because they play in dirt, which could be contaminated, and then put their dirty hands in their mouths. The ingested eggs turn into larvae, which migrate throughout the body causing damage to various organs. They can cause blurred vision if they end up in an eye, for example. Symptoms occur only when the infestation is heavy. Hand washing after contact with dirt or pets is the best prevention.

Hookworms

Hookworms are hair-like in shape and are one-quarter to one-half inch long. Hookworm larvae can be ingested from the environment or can penetrate the skin. They can be transmitted to pups through the dam's milk.

Inside the dog, adult hookworms migrate to the small intestine, where they attach themselves to the intestinal wall and suck blood and tissue fluids. When hookworms move, bleeding continues at the attachment site. Bleeding into the intestines causes the stool to be black and tar-like, and the dog becomes anemic due to blood loss. Heavy infestations of hookworms can be life threatening, especially in young puppies.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University.

Adult Hookworm

Mouth of Adult Hookworm

Hookworm larvae infect humans by penetrating the skin, causing swelling, pustules, redness, and other signs of infection. Preventative measures include not going barefoot in infected soil.

Whipworms

The intestinal **whipworm** of dogs, *Trichuris vulpis,* measures 2 to 3 inches in length and is thicker on the posterior end, giving it a whip-like appearance. Whipworm eggs hatch in the intestines, burrow into the wall of the small intestine, and then move into the large intestine. Adults are found in the cecum, and sometimes in the colon and rectum. An infestation causes the dog to have mucus-filled, bloody diarrhea that can either be chronic or intermittent.

Tapeworms

The adult form of the most common **tapeworm** found in dogs, *Diphylidium caninum,* attaches itself to the lining of the small intestine, with the body and tail of the long, flat parasite flowing free. This tapeworm can be up to 20 inches long.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University.

Adult Tapeworm

Adult Tapeworm Mouth

Segments of these tapeworms, full of eggs, are passed in the feces. As the segments dry, they break open and free the eggs. Adult flea or louse larvae, which serve as the intermediate hosts, swallow the eggs. Intermediate hosts harbor the immature stages of parasites. The eggs develop into an immature form in the insect. When a dog swallows the flea or louse, the immature form of *D. caninum* develops into an adult tapeworm, completing the life cycle.

The tapeworm segments found in the feces appear as small, flat, white rice-like pieces of worms. Tapeworm segments may stick to the hair around the anus. They may also appear as dry, straw-colored rice grains in the dog's bed or on the dog.

Ohio State University Extension.

Tapeworm segments found in stool.

Heavy infestations of *D. caninum* may cause abdominal discomfort or nervousness in the dog. Occasionally the dog may vomit or have convulsions. Dogs may lick their anus or scoot on the ground to get rid of active tapeworm segments. Dogs that have continual flea problems often have tapeworms.

Humans can become infected with the *D. caninum* tapeworm by swallowing a flea that contains tapeworm eggs; however, the risk of infection is low. Children are more likely to become infected than adults, because of playing in dirt and then putting their hands in their mouths, swallowing either the infected flea or segments of tapeworms passed in dog feces. You can prevent tapeworm infection by (1) controlling fleas in your dog and in their indoor and outdoor environments, (2) seeking prompt veterinary treatment if your dog has tapeworms, (3) cleaning up after your dog, especially in public parks and playgrounds, (4) not allowing children to play in areas soiled with dog or other animal feces, and (5) teaching children to always wash their hands after playing with dogs and after playing outdoors.

A second type of tapeworm found in dogs is that of the *Taenia* species. The intermediate hosts of the *Taenia* species are rabbits or rodents, such as mice, and other animals depending on the species of *Taenia*. In the dog, the *Taenia* species attach themselves to the liver, other organs, muscles, and tissues. These tapeworms can grow to be more than six feet long. Tapeworm segments are found in the feces or attached to the dog's fur or surrounding the anus.

The best way to control tapeworms is to control flea and rodent problems. Do not allow your dog to eat rabbits, mice, and other wild animal meat.

Heartworms

The **heartworm,** *Dirofilaria immitis,* is an internal parasite of the heart. Adult heartworms occupy the right chambers of the heart and larger blood vessels. They are spread from dog to dog by mosquitoes. The female mosquito releases living larvae (microfilariae) directly into the dog's bloodstream. These larvae are then removed from the infected dog's bloodstream by the mosquito. After a development period of 10 to 14 days in the mosquito, the larvae are transmitted to another dog when the mosquito takes another blood meal. After the larvae enter the dog's system, they develop further and eventually reach the heart as mature worms. This whole developmental period takes about six months. The mature male and female heartworms then produce microfilariae, which can be detected in the dog's blood by microscopic examination.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University.
Adult heartworms inside a dog's heart.

The first symptoms of heartworms include shortness of breath, a shallow cough, and a tendency towards easy tiring. These symptoms are seldom observed when the microfilariae are first detectable in the dog's bloodstream, but appear after the adult worms have infested the heart and adjacent blood vessels. Early diagnosis is therefore important. Left untreated, heartworms will kill your dog.

Preventive drugs can be given to your dog, but only after he receives the test and is definitely free of heartworms. Giving heartworm preventive drugs without first testing the dog can kill him. Some veterinarians suggest giving preventive medication only during the mosquito season. However, some mosquitoes are present in homes year-round, so giving the preventive drug all year long is advisable. The cost of the preventive drug is less than having to treat your dog for heartworms.

Giardia

Giardia intestinalis is a protozoan found in the upper small intestines of vertebrates. ***Giardia*** is usually picked up from contaminated water. Signs of infected animals include soft stools, diarrhea, and mucous in the stools. Sometimes they have abdominal pain. Fecal exams can be done to see if Giardia is the cause of diarrhea.

Humans can become infected after drinking water infected with *Giardia*. When camping or hiking, treat all water to kill *Giardia* or bring your own water. People can also become infected by putting something in their mouth that has come into contact with the dog's stool. Signs of *Giardia* in humans include diarrhea, nausea, and stomach cramps.

External Parasites

At some time or another, your dog can become infected with external parasites. Clean living quarters, bedding, and equipment are very important to the control of these parasites. However, they may be transferred through contact with other dogs. Proper sanitation practices and avoiding direct contact with infected animals or their waste help maintain the good health of your dog.

Fleas

There are over 2,500 species of **fleas**. One species, the cat flea (*Ctenocephalides felis*) is the most common flea found on dogs. Fleas hop from host to host and suck their blood. A flea can live on a dog for more than 100 days if it is not bothered.

The adult female flea lays several eggs each day while living on the dog. The eggs, which are not sticky, fall from the dog and hatch into larvae in four to six days. The larvae feed on organic matter, molt twice, spin a cocoon, develop into a pupa, and emerge as an adult flea. The life cycle of the flea lasts between 14 and 140 days, depending upon the ambient temperature.

Fleas are intermediate hosts for the *D. caninum* tapeworm. Dogs with fleas may itch, scratch, bite, chew, lose hair, develop bumps on the skin that harbor bacteria, or develop rashes. The saliva of fleas contains a protein that can be extremely irritating to dogs, causing a condition called flea allergy dermatitis. A dog can be sensitive to the bite of one flea. A heavy infestation of fleas could cause anemia.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University.

If you suspect your dog has fleas, look through his hair, especially on the back of his neck, on his belly, behind his elbows, and around the base of his tail. Fleas are large enough to see, and you may see them hopping or crawling. You may not see a flea, but may notice small black specks in your dog's hair. These are the fecal droppings of fleas, called flea dirt. Wet fecal droppings turn red because flea dirt is made up of blood that the flea excretes after feeding on your dog. You can also run a flea comb through your dog's coat to find flea dirt and/or fleas.

To effectively control fleas, you must break their life cycle. Sometimes this is very hard to accomplish and is best achieved using a variety of treatments and techniques that break the flea's life cycle at different stages. There are a variety of products on the market; however, consult your veterinarian for a flea control regimen that fits your needs. Some flea control products kill only the fleas, while others cause the flea eggs to be sterile. Never use a flea control measure made for dogs on cats.

Treating your dog for fleas is one measure of control. But, because new eggs may hatch 8 to 10 days later, the flea population on your dog soon becomes as high as before. Flea eggs may be laid in grass, in your dog's bedding, in the carpet, or any favorite place where he spends much of his time. Your dog may bring fleas in from outside. Therefore, fleas living in the dog's environment must be removed and killed. Vacuum your carpet often to remove eggs that may have been laid on the carpet. After vacuuming, put the debris in the trash outside your house; it contains eggs that can still hatch.

When you have dogs, you are likely to encounter fleas at some point. Flea prevention is much less costly and definitely less aggravating. Once you get a flea infestation in your house, it takes a lot of work and expensive treatment to permanently eradicate the fleas.

Lice

Lice are host specific, meaning they affect only one host species, spending their entire life cycle on the host. Lice also serve as an intermediate host for the *Dipylidium caninum* tapeworm in dogs. Lice live only a few days when off the host.

The most common biting louse to affect dogs is *Trichodectes canis*. This is a small yellow louse found on the dog's head, neck, and tail. The only sucking louse that affects dogs is *Linognathus setosus*.

Irritation from lice infestation causes scratching, which may lead to skin problems. If you suspect lice, you can use acetate tape to trap the louse and then examine and identify it using a microscope.

Medicated soaps, powders, and shampoos are effective in controlling lice. To break the life cycle, the treatment must be repeated at weekly intervals for two or three weeks.

Biting Louse

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University.

Sucking Louse

Ticks

Ticks are arachnids related to spiders and mites. Tick season typically occurs from April to September. The most common tick found on dogs is the **American dog tick,** *Dermacentor variabilis*. This is a three-host tick, meaning that each developmental stage feeds on a different host. The tiny larvae have six legs and feed on rodents for three to six days. They then drop off these hosts. After about a week a larva becomes an eight-legged nymph, feeding on other small animals for three to six days. The nymph then drops to the ground, and after about two to three weeks becomes an eight-legged adult tick. The adults seek out larger animals, such as dogs and humans, attach themselves to the skin, and begin sucking blood. The male tick mates with the feeding female and does not become engorged with blood. The female feeds on the dog (or other host) for 7 to 10 days, becomes distended with blood, drops off, and after several days lays thousands of eggs. The female usually dies shortly after the eggs begin to hatch. The American dog tick is found in weedy and overgrown vegetation. The dog brushes against the vegetation, acquiring the tick. Once on the host, ticks crawl upward, find a place to attach themselves, and begin sucking blood. When adult ticks first emerge, dogs and humans can pick up many tiny ticks in a small weedy area.

Rocky Mountain Spotted Fever (RMSF) is caused by the rickettsia organism, *Rickettsia rickettsii*. This organism is transmitted through the bite of the American dog tick. Any stages of this tick could be infected with *R. rickettsii* and transmit RMSF. Symptoms of RMSF appear in the acute stages, with dogs losing their appetite and developing a fever, pain in their joints and muscles, edema (accumulation of fluid) in the face and legs, and swollen lymph nodes. They also may be dizzy, have seizures, or appear to be in a stupor. Signs appear 2 to 14 days after the tick bite.

Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University.

Ohio State University Extension.

American Dog Tick

The American dog tick can also cause tick paralysis. Some female ticks secrete a toxin that affects the nervous system of certain dogs, causing paralysis. Paralysis usually starts about a week after multiple ticks feed off the dog. Typically, the hind limbs are affected, but in some dogs, tick paralysis affects the front limbs. If not treated, death can occur if the paralysis spreads to the respiratory system. Once the ticks are removed, most animals quickly recover.

The American dog tick does not transmit Lyme disease.

A second tick to mention is the **brown dog tick.** It is also a three-host tick, although in a domestic environment it may feed on the same dog throughout its life cycles instead of finding intermediary hosts. The brown dog tick feeds almost exclusively on dogs, and is found in homes and kennels. These ticks are found worldwide and more commonly in warmer climates. High infestations of brown dog ticks can cause skin irritation and diseases in dogs. Brown dog ticks rarely cause diseases in humans.

Various species of the **deer tick**, also known as the black-legged tick, are the main carriers of the bacteria that causes Lyme disease. The deer tick is much smaller than the American dog tick. The deer tick is also a three-host tick. Lyme disease can be transmitted from the larval stage to the nymph stage. If a nymph is not already infected with bacteria that cause Lyme disease, it can pick it up in this stage. Adult females, infected with Lyme disease as larvae or nymphs, may transmit this disease when feeding on dogs or humans. Male ticks attach but do not become engorged with blood and do not transmit Lyme disease.

If the deer tick is infected with Lyme disease, it must be attached for 24 to 48 hours before it transmits Lyme disease.

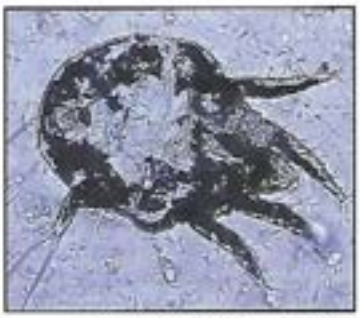
Avoid ticks by keeping dogs out of weedy, tick-infested areas, especially during spring and summer, when ticks are most prevalent. Inspect yourself and your dogs daily. Exercise your dogs in mowed areas.

If a tick should become attached to you or your pet, remove it as soon as possible. To do this:

1. Use a paper towel, tweezers, or disposable gloves to keep the tick from coming into contact with your skin. DO NOT remove the tick with bare fingers!
2. Grasp the tick close to the dog's skin (or your skin), and with steady pressure, pull it straight out. Do not twist or jerk the tick, as mouthparts may be left in the skin. Do not crush or puncture the tick during removal.
3. Do NOT light the tick with a match as this may cause the tick to burst. Rocky Mountain Spotted Fever may be acquired from infected tick body fluids that come in contact with broken skin, the mouth, or eyes.
4. Avoid touching ticks with bare hands, as tick secretions can be infectious.
5. After removing a tick, thoroughly disinfect the bite site and wash your hands with soap and water.
6. Safely dispose of the tick by placing it in a container of oil or alcohol, sticking it to tape, or flushing it down the toilet.

Mites

Mites also belong to the arachnid family. There are several species of mites that infect dogs.



Courtesy of Cliff Monahan, DVM, PhD, College of Veterinary Medicine, The Ohio State University

"Walking dandruff" is a disease caused by *Cheyletiella mites*. It is called walking dandruff because if you closely observe the skin, you see scales, or the dandruff, moving on the skin. This mite can live several days off its host, so it is possible for animals to become infected from environmental contamination, such as from bedding. The symptoms of walking dandruff include skin irritation, typically along the dog's back. Infested dogs might have slight hair loss, itching, scales (dandruff), and maybe some thickening of the skin. Most common insecticides used to kill fleas also kill these mites. If these mites are found on a dog, the environment the dog has come into contact with must be treated. Humans can become infested with *Cheyletiella* mites, causing mild skin irritation and itching.

Ear mites (*Otodectes cynotis*) infect the ear canal of puppies and dogs. They can also live on other parts of the dog, including the feet and tail. Ear mites are extremely contagious, and can be passed from the bitch to her puppies, and are easily spread to other species of pets.

The symptoms of ear mites include the animal shaking his head and/or scratching around his ears. If there is a heavy infestation of ear mites, ear scratching and head shaking intensifies. The ear canals bleed, with either fresh or dried blood appearing inside the canal. Dried blood looks like coffee grounds. (Ear infections could also be caused by bacteria and/or yeasts, and are more common in dogs with drop ears or a lot of hair in their ears.) Consult your veterinarian if you think your dog may have ear mites or an ear infection. If not treated, ear mites can cause serious damage to the ear canals and ear drums, and cause permanent hearing loss. Ear mites are not transmissible to humans.

Demodectic mange, also known as red mange, puppy mange, or follicular mange, is caused by the mite *Demodex canis*. It is a skin disease typically found in puppies and young dogs. The mites are transferred by direct contact from the bitch to her puppies within the first week after birth. These mites do not contaminate the environment, such as bedding or kennel areas; therefore, the dogs' surroundings do not need to be treated. *Demodex* mites of various species live on the bodies of almost all dogs as a part of their normal skin flora, and on most people, without causing any harm. These elongated mites live in the hair follicles and oil glands of the skin. Young dogs that have an immature or deficient immune system, or older dogs suffering from a depressed immune system, are prone to developing demodectic mange. The lesions and hair loss caused by the mites may be localized in one area on the body, or spread over different regions or the entire body. Signs include hair loss, with crusty and inflamed (red) skin. Usually the hair loss is first noticed around the dog's eyes, muzzle, and other areas on his head. As the puppies develop their own immunity, most of these lesions heal on their own. Heavily infected dogs may lose their appetite, develop a fever, and become listless. Skin scrapings can identify demodectic mange. Treatment is achieved systemically, with drugs that travel through the bloodstream to kill the mite, and topically, as prescribed by your veterinarian. Some dogs die from demodectic mange.

Dogs with histories of demodectic mange should be spayed or neutered and NOT bred. Sensitivity to these mites can be passed genetically from one generation to another. Humans cannot get the form of *Demodex* mites that affect dogs.

Sarcoptic mange, also known as canine scabies, is caused by *Sarcoptes scabiei*. These microscopic mites can infect all ages and breeds of dogs, causing hair loss and severe itching. *Sarcoptes* mites prefer to live on dogs, but they can live in the environment for two to six days. Therefore, dogs can become infected by picking up a mite on bedding, etc., not just by direct contact with an infected dog. The hair loss and itching typically occurs where there is less hair such as the elbows, ears, chest, armpits, hocks, and belly. The infection can spread over the dog's entire body, with small red pustules developing along with yellow crust on the skin. Sarcoptic mange is sometimes misdiagnosed as skin allergies, so a skin scraping must be done to determine if this mite is causing the irritation. If your dog has sarcoptic mange, your vet probably will prescribe a systemic treatment or topical solution to rid him of the mites. The dog's environment must also be treated.

Humans can get sarcoptic mange from dogs, but it typically causes only temporary itching, and then the mites die.

Chiggers, or *Trombicula* mites, are most often found on the dog's legs, head, and belly. Some dogs are not bothered by chiggers, while others may scratch the infested area. The larvae hatch from the eggs in late summer and crawl onto the host. Attached to the dog or human, they feed on fluid for several days, and then detach themselves. Chiggers seem to live in the same places from year to year, so avoidance of tall grass and weeds where chiggers inhabit is the best prevention. In humans, the bite from the mite causes a small welt, usually around the ankles, that causes severe itching for several days. Topical treatment is available from your veterinarian for chiggers found on dogs, and at your local pharmacy if you have chiggers.