



ASPCA AnimalLessons™

Teacher Newsletter of The American Society for the Prevention of Cruelty to Animals

Pet Population: Behind the Numbers

Puppies and kittens are undeniably cute. Their small round bodies and little faces bring smiles to just about everyone. Psychological research suggests that this magnetism is no accident. We are “hard wired” to like babies, both the human and non-human kind. Advertisers take advantage of our attraction to baby animals to sell everything from shoes to computers. Regrettably, this natural appeal has tragic consequences, contributing to the death of millions of dogs and cats each year.

The tremendous affection that Americans have for puppies and kittens helps fuel the acquisition of pets. Various estimates put the number of pet dogs at about 56-58 million and the number of pet cats around 63-65 million. Millions of people acquire companion animals each year, and most of these animals and people form long lasting, loving bonds that enhance the lives of people and pets. Unfortunately, far too many pets leave their homes each year, relinquished to animal shelters, given away to friends, relatives, neighbors and strangers, or simply set free as strays. Some of these are puppies and kittens that are the result of accidental or unplanned breeding, and others are young adults that were acquired during their “young and cute” stage then discarded as the novelty and attraction waned. A number of these animals will be rehomed with new families where they will live out their lives as valued companions. Others will die of sickness and injury as strays. Still others may end up in animal shelters where they have a chance at new life or where the final kind act they experience may be a gentle hand ending their life. Presently there are no national reporting agencies for animal shelters though projections would put the numbers in the range of 5-8 million dogs and cats entering shelters annually and the number euthanized estimated at 3-6 million.

Several factors, both biological and social, combine to cause the reality of homeless pets and the conse-

quences they face. As domesticated species, dogs and cats differ from their wild ancestors in several key characteristics. First and foremost, they have been selected to socialize with people. In addition, like other domestic animals, they were bred to have higher reproductive rates. Dogs and cats become sexually mature at an earlier age than their wild counterparts, are able to mate more often and typically have larger litters of young. Cats for example can reproduce as young as 5-6 months of age, are capable of breeding twice per year and may average 6 young per litter. As a result a single pair of cats can give rise to a population as high as 2,048 in two and half years, assuming litters are equally divided between male and female kittens. A pair of African wildcats, the likely ancestor of the domestic cat, would produce a population of about 18 in the same time period given their



later age for sexual maturity, breeding frequency of once a year and smaller litter size of about 4 kittens. Similar differences would be seen between the reproduction of dogs and their ancestor, the wolf. While these numbers are projections, it does point out the vast difference in reproductive potential between wild animals and domestic animals as a result of the domestication process. It also argues strongly in favor of intervention. Humans created this high level of reproductive potential and it is therefore incumbent upon us to provide some means of population control for our companion animals.

Neutering or gonadectomy is the general term for rendering an individual, male or female, incapable of sexual reproduction. Males are castrated and females are spayed. Castration is the removal of the male's testicles. Spaying is the removal of a female's ovaries and uterus. However, because the term castration can be discomfoting to some, it is more common to refer to males being neutered hence the phrase "spay/neuter". Neutering of companion animals is currently a surgical procedure performed by licensed veterinarians, but the neutering of animals probably dates to the very earliest stages of animal domestication. Male livestock were frequently castrated to control their behavior. By the beginning of the 20th century surgical sterilization of companion animals was practiced to control both breeding and behavior. In the early 1900s, female dogs were spayed between 3-6 months of age and males were castrated before 2 months old. By the middle of the century, it was more common to neuter dogs and cats after they reached sexual maturity or 6 months of age. Develop-

ments in anesthesia and surgical techniques over the past 15 years have made early age spay/neuter safe and effective.

In addition to preventing unwanted litters of dogs and cats, neutering also provides behavioral and medical benefits. Neutered male dogs and cats are less likely to have aggression problems, roam from home and mark their territories with urine. They are also protected against cancer of the testes and certain diseases of the prostate gland. The chances of developing ovarian and uterine cancers is eliminated by spaying females and the incidence of breast cancer is also greatly reduced.

Until the 1960s, neutering of dogs and cats to control unwanted behaviors and breeding was performed primarily for the convenience of pet owners. By the mid-1960s, however, greater attention to the widespread euthanasia of homeless and unwanted dogs and cats prompted many animal shelters to begin requiring the neutering of dogs and cats when they were adopted. Animal welfare groups also began extensive education programs for the general public to encourage the neutering of pets and help reduce the numbers of unwanted companion animals.

These efforts have helped to lower the number of dogs and cats entering animal shelters in quite a few American cities. For example, in the 1920s ASPCA shelters in New York City took in nearly 300 thousand dogs and cats each year. By the mid-1990s that number was down to 50-60 thousand animals. Continued education and intervention will be needed to encourage the neutering of companion animals and the careful decision-making by families of the lifetime commitment required for the care of a companion animal. Additional resources to help pet owners who wish to keep their pets, but are having trouble dealing with a variety of pet behavior problems or personal crises will also be needed. Information technology is already being used to help pets. The Internet provides a wide range of information on pets, including health care and behavior. It is also possible to look for just the right dog or cat to join your family by visiting on-line "cyber-shelters" where dogs, cats and other animals available for adoption at animal shelters and rescue groups across the country are listed.

The domestication of dogs and cats has provided humans with great benefits over the past centuries. They have entered our families and homes and help to enrich our lives as we enrich theirs. Responsible education and action are needed to ensure that our animal companions do not become victims of too much of a good thing.



Teacher's Instructions

In general, the subject of pet overpopulation is not appropriate for children in Grades K-2 so we designed Activity Sheet 1 which takes a softer approach by introducing students to the fact that all pets do not find homes. The subject is appropriate for kids in Grades 3-8, however, it can become tricky when the related topics of reproduction and euthanasia come up.

The National Science Education Standards, developed by the National Research Council, do not require content knowledge of sexual reproduction before Grade 5. Luckily, you do not need to cover the specifics of reproduction to do a lesson on pet overpopulation—spaying and neutering need only be described as an opera-

tion that results in the animal not being able to have or make babies. In middle school (Grades 6-8), discussing spaying and neutering in conjunction with sexual reproduction is an excellent way to introduce the topic.

Talking about euthanasia can also be difficult. It is likely that your students will bring up having to put down animals as a means of controlling the pet population. In your discussions, remember not to vilify shelter staff for having to euthanize animals. Regrettably, they must make room for the never-ending new arrivals coming in to the shelter. Describe the procedure as a necessary and humane alternative to turning animals away to be abandoned on the streets.

Any lesson on pet overpopulation should include the following concepts at a level that is age appropriate for your class:

- define pet overpopulation.
- describe why the problem exists.
Pets can: reproduce at an early age; have multiple births or litters and mate more frequently than their wild counterparts.
- make students understand that puppies, kittens and other baby animals do not remain babies forever
- and that it is not fair to abandon an animal when he or she is no longer a baby.
- highlight the potential outcomes for homeless pets: find a home; brought to a shelter; adopted from a shelter; abandoned or die.
- explain the role and purpose of animal shelters
- make students understand that an animal is a bonafide member of the family and as such, the family should plan to keep the animal for the rest of his or her life.
- emphasize the benefits of spaying and neutering a pet: can't reproduce; less likely to develop certain diseases; fewer behavioral problems and fewer animals needing homes.

Activity Sheet 1: Grades K-2

Students learn that all pets do not find homes and are introduced to animal shelters as a place where companion animals should be taken if they are lost and/or need to find a new home. Students match the cats and dogs to homes so that the numbers add up to 20. Include the name, location and phone number of your local shelter in the lesson. Explain that if students encounter a lost or abandoned animal, they should ask an adult to

call the local shelter or animal control facility. Children should never approach or touch an animal they do not know. Let students know that the animal shelter is a place to look if your family has decided to bring a new pet into the home. **Mathematics Standard 3. Uses basic and advanced procedures while performing the processes of computation; NCTM Standard: Number and Operations.**

Activity Sheet 2: Grades 3-8

This quiz can be used in conjunction with Activity Sheets 3 and 4. Answer: 1) True — Animals are neutered to prevent them from making babies; 2) True — Animal shelters take in millions of lost, abandoned and relinquished (given up) animals each year. They try to find homes for as many animals as they can but there are not enough homes willing to adopt all the animals in shelters; 3) False — Lack of exercise and overeating make pets fat and lazy not spaying or neutering; 4) False — Spaying and neutering are very safe operations. Pets are usually back to normal a couple of days after the surgery; 5) True — Advances in anesthesia and surgical techniques have made early-age (2 months old) spaying and

neutering safe and effective; 6) False — The younger a female is spayed the healthier she will be. It is best to spay an animal before she is old enough to give birth; 7) True — Males roam and mark territory in order to find a mate; 8) False — Spaying or neutering animals reduces the risk of many cancers, diseases and infections; 9) False — There are low cost spay/neuter clinics or services in communities across the country and 10) True — Spaying or neutering pets helps to control the pet population by not adding to the problem. Many animals resulting from unplanned or unwanted litters end up in shelters or on the streets.

Activity Sheet 3: Grades 3-5

Children learn how many kittens can result from one unsprayed female cat by solving simple addition and multiplication problems. Instruct children to read each math problem and fill in the number of kittens in the column on the right. The right column should then be totaled to get the correct number of kittens. Review the answers in class and discuss what the family

could have done to prevent so many kittens without homes from being born. The answer of course is that they could have had Samantha spayed. Answers: 1) 1; 2) 5; 3) 4; 4) 15; 5) 6; 6) 8; 7) 35; and Total) 74. **Mathematics Standard 3. Uses basic and advanced procedures while performing the processes of computation. NCTM Standard: Number and Operations.**

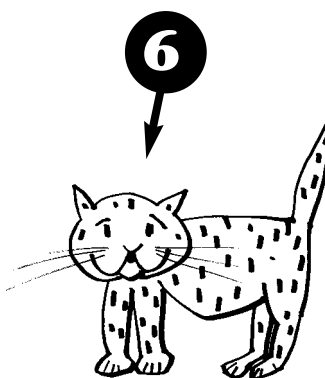

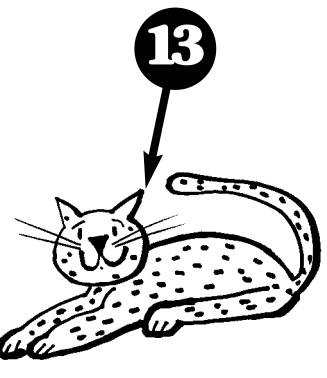
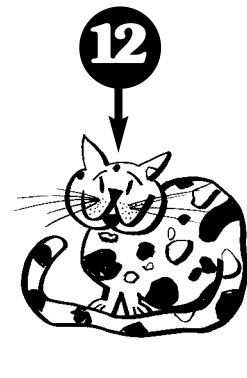
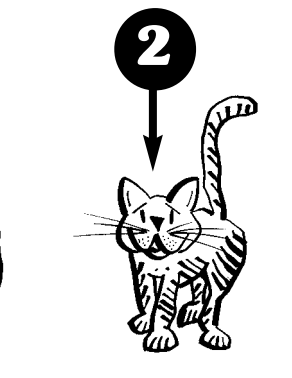

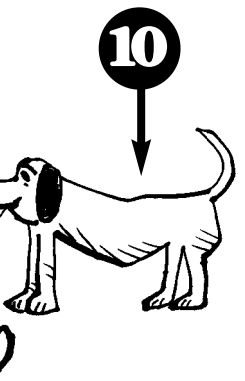



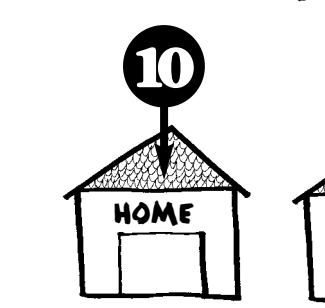
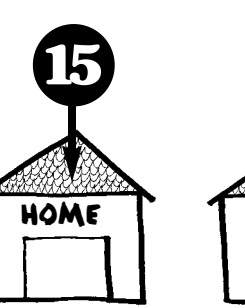
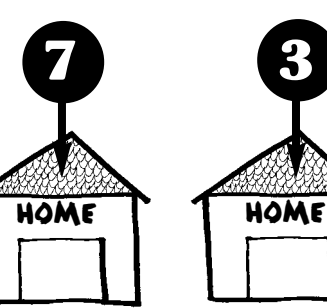
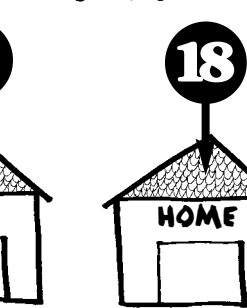
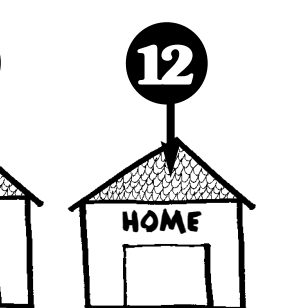

Activity Sheet 4: Grades 6-8

Discuss with your class the differences in reproductive rates between domesticated animals and their wild ancestors and why this came about (see article, Pet Population: Behind the numbers). Hand out Activity Sheet 4 and review the variables that effect population size: age of sexual maturity, number of times animals breed in a given year, litter size and the number of males and females in each litter. Explain that students will be calculating the growth of two populations, domestic cats versus African wild cats. For our purposes, population size or Total Cats equals the number of New Kittens plus the Previous Total Cats from the earlier time interval. We also assume that each population starts out with one mature male and one mature female (Total Cats = 2) and that mor-

tality is 0 for 4 years. The number of New Kittens is equal to $\frac{1}{2}$ the Total Cats times Litter Size (6 for domestic cats and 4 for African wild cats). As an extension activity, students can graph the data on a separate sheet of paper and then calculate the reproductive rate for both populations. Answers: Domestic cat: 1 yr (24, 32); $1\frac{1}{2}$ yr (96,128); 2 yr (384,512); $2\frac{1}{2}$ yr (1536, 2048); 3 yr (6144, 8192); $3\frac{1}{2}$ yr (24576, 32768); and 4 yr (98304,131072). African wild cat: 1yr (4,6); $1\frac{1}{2}$ yr (0,6); 2 yr (12,18); $2\frac{1}{2}$ yr (0,18); 3 yr (36,54); $3\frac{1}{2}$ yr (0,54); and 4 yr (108,162). **Mathematics Standard ?Understands and applies basic and advanced properties of functions and algebra. NCTM Standard: Numbers and Operations Algebra.**

Activity Sheet 1: Grades K-2

Match the **animal** to the **home** so that the two numbers sum to **20**.

- Did all of the animals find a home?
- How many cats found a home?
- How many dogs found a home?
- How many cats did not find a home?
- How many dogs did not find a home?
- Where can the animals that did not find a home be taken care of until they find one?



Pet Population Quiz

Test your knowledge of spaying and neutering by taking the following quiz. Mark each statement True or False. If the statement is False, write a True statement in the line provided.

1 Animals are neutered to prevent them from making babies.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

2 There are more animals in shelters than there are homes willing to adopt them.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

3 Spaying or neutering a pet will make him or her fat and lazy.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

4 Spaying and neutering are dangerous operations.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

5 Cats and dogs can be spayed or neutered as young as two months old.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

6 Female animals should give birth once before they are spayed.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

7 Neutered males roam and mark their territory less than un-neutered males.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

8 Spayed and neutered animals are not as healthy as animals who have not been spayed or neutered.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

9 It is very expensive to have a pet spayed or neutered.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

10 Responsible pet owners spay or neuter their pets.

TRUE	FALSE
<input type="checkbox"/>	<input type="checkbox"/>

Cats, Cats and more Cats!

Animal shelters take care of millions of lost, abandoned and relinquished (given up) animals each year. They try to find homes for as many as they can, but there are not enough homes for all the animals in shelters.

Read each sentence and write the correct number of new kittens in the column to the right. When you finish, add up all the numbers. This will help you understand how quickly cats can fill up shelters!

1 Last December, a family adopted **ONE** unspayed female kitten. She was two months old. Her name is Samantha.



2 In March, Samantha had **FIVE** kittens. Two were male and three were female.



3 In July, Samantha had her second litter. She had **FOUR** kittens, two males and two females.



4 In September, Samantha's **THREE** daughters from her first litter each had **FIVE** kittens. Seven were female. (3x5)



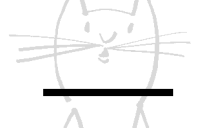
5 In November, Samantha had her third litter of **SIX** kittens. They were all female.



6 In January, her **TWO** daughters from her second litter each had **FOUR** kittens. Five were female. (2x4)



7 In March, **SEVEN** of Samantha's granddaughters each had **FIVE** kittens. (7x5)



Total number of kittens that were born because of one unspayed female cat in one year!

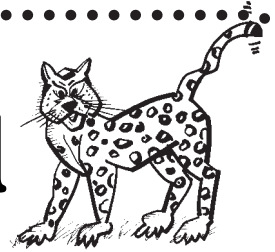


What could the family have done to prevent so many kittens without homes from being born?

Adapted from Dog & Cat Overpopulation:101 by The Fund for Animals, New York, NY

Activity Sheet 4: Grades 6-8

Domestic vs. Wild



When humans domesticated cats and dogs, they not only chose animals that would be more sociable with people, they also selected for higher reproductive rates.

Domestic cats, for example, can reproduce as young as 5-6 months of age and may breed twice a year. As a result a single pair of cats may result in a population as high as 2,048 cats in 2 1/2 years, assuming breeding at 6 months, 2 litters per year and 6 young per litter equally divided between male and female kittens. A pair of **African wildcats** would produce a population of about 18 in the same time given a later age for sexual maturity, breeding just once a year and a smaller litter of 4 kittens.

Complete the following table by using the formulas at the top of each column. Assume each population starts out with a total of two cats, one mature male and one mature female cat. Show your work in the space provided.

	Domestic Cat (Breed twice per year)		African Wildcat (Breed once per year)	
Time	New Kittens = $\frac{1}{2}$ Total Cats x 6	Total Cats = New Kittens + Previous Total Cats	New Kittens = $\frac{1}{2}$ Total Cats x 4	Total Cats = New Kittens + Previous Total Cats
Start	0	2	0	2
6 months	1 x 6 = 6	6 + 2 = 8	X	2
1 year			X	
1 1/2 years			X	
2 years			X	
2 1/2 years			X	
3 years			X	
3 1/2 years			X	
4 years			X	

How does the difference in reproductive rate effect how we control the population of domestic cats? How does it effect the protection of the African wild cat?

As an extension activity, graph the domestic cat and African wild cat populations at 6 month intervals on a separate piece of paper. Determine the reproductive rate for both populations using $y=mx+b$.



The Cat's Meow!

Kids learn about our relationship with cats throughout history and the story of their domestication. Lists the top ten things children can do for their feline friends.

Hot Diggity Dogs!

Explains how dogs became members of our human families and how no matter the breed, all dogs are descended from the wolf. Lists the top ten ways youngsters can make their pooch happy.

These colorful, four-page handouts are written for kids in grades 2-6 and contain engaging stories and fun activities. Each title is sold in sets of 100 copies and costs \$19.95 (includes S&H) or pay \$35.95 for both.

To order, send your check or money order to ASPCA Education Department, 424 East 92nd Street, New York, NY 10128-6804 or call 212-876-7700, Ext. 4410.



This edition of ASPCA *AnimalLessons™* is distributed by your local animal-welfare organization:

ASPCA *AnimalLessons™* is published by The American Society for the Prevention of Cruelty to Animals. All rights reserved.

Reproduction in whole or in part without written permission is prohibited. Notwithstanding the foregoing, permission is hereby given to individual classroom teachers to reproduce the activity pages for classroom use; however, reproduction of these pages for an entire school, district or school system or for commercial use is strictly prohibited.

To obtain information about the ASPCA contact Steve Dercole, ASPCA, 424 East 92nd Street, New York, NY 10128; (212) 876-7700, ext. 4410.

Contributors to this newsletter include Steve Dercole, Sheryl Dickstein Pipe, Ph.D., Miriam Ramos, Jacque Schultz and Stephen Zawistowski, Ph.D.

© 2001 The American Society for the Prevention of Cruelty to Animals.

Visit the ASPCA's web sites at aspc.org or animaland.org

ASPCA®

The American Society for the Prevention of Cruelty to Animals

424 East 92nd Street

New York, NY 10128

