

Fleas Among Us



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Preface

FLEAS are a very diverse group that can be found all over the world, with more than 2,000 different species of fleas found worldwide. They live on a wide variety of hosts and they can develop large populations in a short period of time. Around 94% of fleas will be found on mammals and about 5% will be found on birds. The most commonly found flea is the cat flea (*Ctenocephalides felis*).

Fleas are considered external parasites, since it is dependent on its host for a blood meal. Fleas can infest such areas as homes, barns and bird cages. Both males and female fleas bite and suck blood. The bite often leaves an itchy, red spot. Secondary infections can be caused by scratching the flea bite, especially in children.

Fleas are considered a health concern, since they are able to spread many diseases to humans. Fleas, such as *Ctenocephalides felis* and *Xenopsylla cheopis*, transmit murine typhus and plague to humans and companion animals. Murine typhus is common in South Texas and it has been a reportable disease in Texas for 40 years. The plague bacterium has been found in the western two-thirds of Texas in populations of squirrels, prairie dogs, rats, and mice, according to the Texas Department of State Health Services. These animals act as reservoirs for this bacterium. They allow the bacterium to be transmitted to humans and companion animals, if they are bitten by an infected flea.

In this booklet are a series of exercises to assist with educating your students about fleas and various methods that can be used to decrease flea populations.

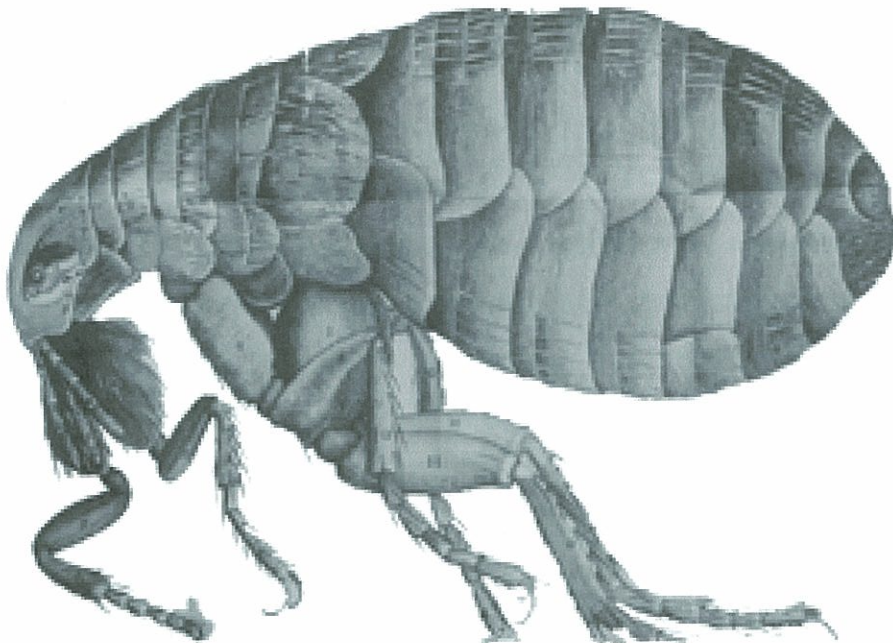
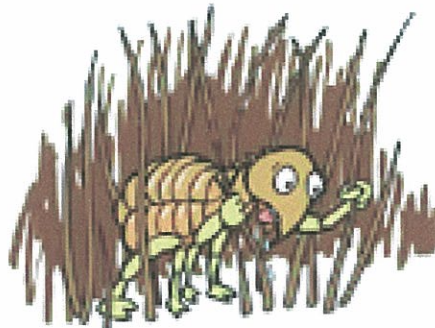


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Lesson 1: The Fascinating Flea

Approximate time: 25 minutes

Overview: Students will read the following passage in the classroom and then answer relevant questions pertaining to the passage. The students will get an overview about the flea's biology and habits.

Ask the students before reading the passage: Have they ever seen a flea? What do fleas look like (what color, size, shape)? What animals have they seen fleas living on? Have they ever seen a flea on an animal?

Objective: Students will be able to recognize fleas from other insects, they will know how the flea completes its lifecycle, and they will know what types of animals have fleas.

TEKS

Science

2.1a, 2.1b, 2.2a, 2.2b, 2.3a, 2.3b, 2.4a, 2.4b, 2.6a, 2.6b, 2.8a, 2.8b, 2.9a, 2.9b
3.1a, 3.1b, 3.2a, 3.2b, 3.3a, 3.3b, 3.5a, 3.5b, 3.8a, 3.8b, 3.9a, 3.9b

Materials:

Handouts of passage and questions 1-5.
Overhead copy of the passage.

Instructions:

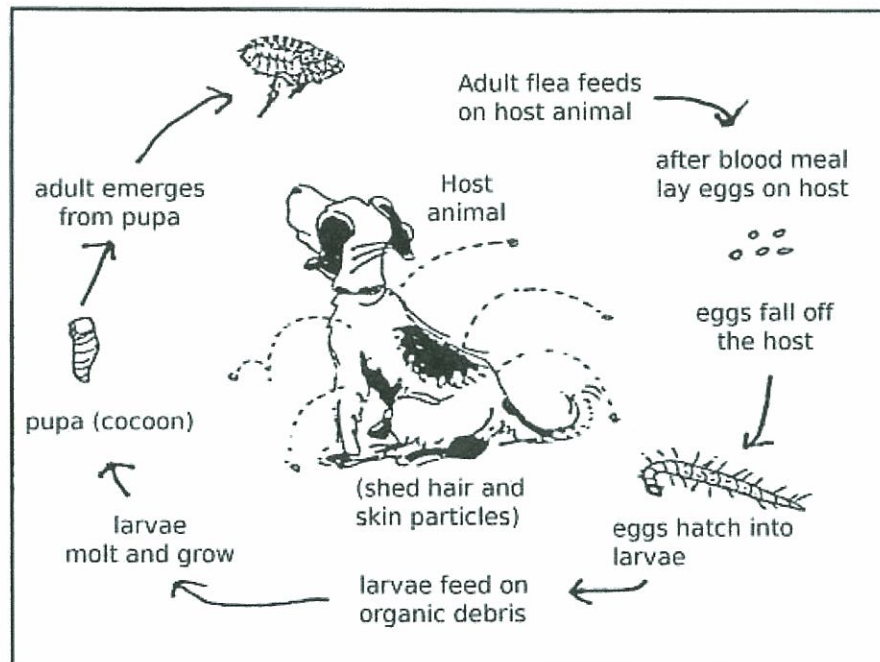
Read the passage either in groups or as a class:

Fleas are wingless insects found in the **Order Siphonaptera**. The flea's **exoskeleton** is hard, shiny and covered with hairs and spines. Fleas are dorsal-ventrally flattened to allow movement on their furry hosts. Fleas have short antennae located in grooves on the head and do not have compound eyes. They have strong hindlegs that allow them to jump away from danger or onto a host. It is estimated that a flea can jump over 7 inches high and 13 inches long.



Fleas live on many warm-blooded animals, such as dogs, cats, squirrels, rats and mice. They have sucking mouthparts in order to suck blood from their host. The most commonly found flea is the cat flea (*Ctenocephalides felis*). Contrary to its name, the cat flea may feed on cats, dogs, and accidentally on humans.

The flea develops through four life stages: eggs, larvae, pupae, and adults. Female fleas lay around 40-50 oval eggs a day on its host. Once the eggs are laid on the host, they fall off onto the ground below. This means that eggs may fall into bedding, carpet, backyards or wherever the animal roams. The eggs are tiny and white in color, but they are visible to humans. The eggs hatch into larvae. The flea larvae are also visible but they are translucent white, with dark colored internal organs. The larvae do not have eyes or legs. Since the flea larvae develop on the ground, there is an endless amount of food for development. The larvae mainly eat dried blood and skin flakes. The larvae must live in indoors or in shaded areas outdoors, since they are usually killed when temperatures reach above 95° F. Flea larvae would die if they developed in open areas under the summer sun, since temperatures tend to reach over 100° F in the summer. The larvae molt two times before pupating in silk cocoons. The silk cocoons are sticky in order to attract dirt and other debris that is used as **camouflage**. When fleas are developing indoors, the pupal stage is usually found under the carpet. The carpet serves to protect and provide shelter for the developing flea. The adult flea will remain in the silk cocoon until it senses vibrations and carbon dioxide from a potential host. Once a host is located, the adult flea will emerge from the silk cocoon and jump onto its host. Adult fleas tend to emerge faster in higher temperatures, but they can remain in the cocoon for 12 months. The complete lifecycle from egg to adult usually takes 3 weeks.



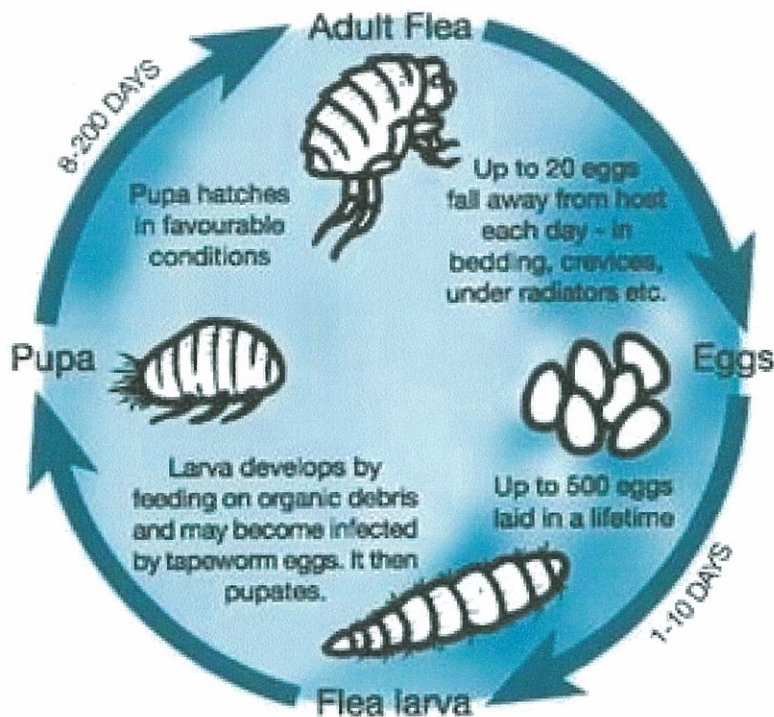
Questions to answer:

1. What order is the flea found? Fleas are found in Order Siphonaptera.
2. What type of mouthparts does a flea have? Fleas have sucking mouthparts.
3. How many stages are in a flea's lifecycle? There are four stages in the flea's lifecycle.
4. How is a flea able to jump? Fleas have strong hindlegs that allow them to jump.
5. How many days does it take a flea to complete its lifecycle, from egg to adult? It usually takes around 3 weeks for a flea to complete its lifecycle.

Wrap-Up:

Remind students of the adult flea's characteristics, potential flea hosts, and characteristics of each stage in its lifecycle.

Remember The Lifecycle of The Flea



Across

2. What color are flea eggs?
3. How many lifestages do fleas have?
6. Do fleas have compound eyes?
7. Are fleas wingless?
9. What allows fleas to jump?
10. What type of area do flea larvae not like to develop?

Down

1. What type of mouthparts do fleas have?
4. What animals do fleas feed on?
5. Where are flea pupae commonly found indoors?
8. What do flea larva feed on?

Word Bank

White	Carpet	Yes
Furred	No	Hindlegs
Skin	Sunny	Piercing-Sucking
Four		

Lesson 2: How do fleas feed?

Approximate time: 20 minutes

Overview: Students will read the following passage in the classroom and then answer relevant questions pertaining to the passage. The students will get an overview about how a flea feeds.

Ask the students before reading the passage: Have they ever been bitten by a flea? What animals have they seen fleas living on? Have they ever been bitten? What time of year have they been bitten?

Objective:

Students will be able to know how a flea feeds, what it feeds on and why the female flea must feed on blood.

TEKS

Science

2.1a, 2.1b, 2.2a, 2.2b, 2.3a, 2.3b, 2.4a, 2.4b, 2.6a, 2.6b, 2.8a, 2.8b, 2.9a, 2.9b

3.1a, 3.1b, 3.2a, 3.2b, 3.3a, 3.3b, 3.5a, 3.5b, 3.8a, 3.8b, 3.9a, 3.9b

Materials:

Handouts of passage and secret code activity, "Feeding the Fleas."
Overhead copy of the passage.

Instructions:

Read the passage either in groups or as a class.

Adult fleas are the only life stage that lives on furred animals and feeds on blood. The adult flea can live between 4 to 25 days. Female fleas, like mosquitoes, require a blood meal in order to produce eggs. The female flea can lay eggs within 24 to 48 hours after her first blood meal. Both male and female fleas bite and suck blood for nutrition. Adult female fleas require a blood meal to produce **fertile** eggs. A female flea can produce between 400 to 800 eggs in about five months. Their eggs are laid on the furred animals, but then fall off, since they are not glued onto the animal's hairs. This means the flea eggs can fall off onto many different areas such as into bedding, carpet, the yard or wherever the animal spends time.

When fleas bite humans, they can cause swollen, red bumps on the skin. They are able to bite any part of the human body, but they most commonly bit our legs. Some people react more than others to flea bites. Ice or calamine lotion can be applied to the bite, in order to stop the itching. A doctor should be seen, if severe allergic reaction occurs.

Adult fleas can live months without a blood meal. However after the adult flea takes its first blood meal, changes occur within their bodies. These changes force the adult flea to find another blood meal within a few weeks or it will die.

Exercise: Feeding the fleas

Directions: Match the number to the corresponding letter at the bottom to fill in the missing words in the sentence.

1. Fleas feed on _____.
2 12 15 15 4
2. Both _____ and _____
13 1 12 5 19 6 5 13 1 12 5
_____ feed on blood.
19
3. _____ fleas are the only lifestage to feed on blood.
1 4 21 12 20
4. Fleas have to feed on a furred _____ in order to
1 14 9 13 1 12
survive.
5. Flea _____ feed on skin and dried blood.
12 1 18 22 1
6. Flea _____ do not feed.
16 21 16 1 5
7. Female fleas require a _____ meal, like mosquitoes to
2 12 15 15 4
produce fertile eggs.
8. Fleas _____ live without a blood _____
3 1 14 14 15 20 13 5 1
_____.
12
9. Fleas complete their lifecycle faster in _____
23 1 18 13 23 5 1 20 8
_____.
5 18
10. When _____ is
3 1 18 2 15 14 4 9 15 24 9 4 5
sensed in the air, fleas will emerge from pupal cases.

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

Wrap Up:

1. What lifestage feeds on blood? *The adult flea feeds on blood.*
2. How long can adult fleas live without a blood meal? *Adult fleas can live months without a blood meal.*
3. What type of host must a flea live on? *The flea must live on a furred host.*
4. What do female fleas need to produce eggs? *The females need blood to lay fertile eggs.*
5. How long does it take for female fleas to lay eggs after feeding on blood? *It takes 24 to 48 to lay eggs after feeding on blood.*



Enhancement Activities: Feeding Frenzy Word Find

Directions for Word Search: Find the words in the word box within the block of letters.

Feeding Frenzy

OME OAMS C X A I A Y U T X H W D Z M Y B C S
QU D V A F T S L N Y X D N N K R V V Y Y S I F X
D G R L N K E J S J B L L U Y D Y A I W K C T X E
T A E Q X H P E C R T F H J L E P F N E U S E G O
L C M Z K O C K R G N B E V A T K Z W S A F I X A
L W T Z X T A X T E X R Q H N E H B B E N B I S D
N I H C S M E F V A R U F Z A O U O H S M H W X N
O J F Q V L M M X R O Z L G R N O T U O H F N B C
J R D E U U G D S N Y T B Y J N Q V C M Q Q M C U
F Y Q V S K N K C J T N I T M B A H G W Q S T A J
F S R D M T I R V V P O J P E A M B R E J Y V N P
O U B W I H A K Q Y X M U L U Z G Q W A H E J I E
B G H M J Z J G S Q P G Z H P W Q B D Z I Z T M H
F G J H S R O M E Y C Q O B X X V K Z Q B R E A B
B C D B V N T K T M U S S Y A I S O C K S S D L Z
S B O U K Q A P U P D I H U N J O W K V S C O S U
M R Z M V S A M B E Q L H H A I F N F P P I O H E
T J E L A M E F U N N W Q C U E T S J X L L L T I
U W E D O K O G K H C T B B J O Y R G X B N B B S
D V Q R M V E Y K D F B K D G A R G F T P V E T C
C E L E R P G X D I X K K L A F E W R R I O T L J
U K P U B A N U B L L Y Z T K M E W L T W U Y P I
P N F Z B T B J J M D Q H R P F C Z R A L T L X O
L M W V I Y C I K C V Z L Q Q M J R A A C V B V D
K M F Y D A T H X U O S W B J T V J C S R T H I K

ADULT
BITE
EGG
HUMANS
LARVA
MALE
PUPA
TINY

ANIMALS
BLOOD
FEMALE
INSECTS
LIFESTAGE
PETS
SOCKS



Lesson 3: My pet has fleas...how did that happen? Approximate time: 30 minutes

Overview:

Students will read the passage regarding how a pet becomes infested with fleas.

Ask the students before reading the passage: Have they ever seen fleas on any animal? Have they ever seen fleas on their pets? Have they ever seen fleas in their yards? Have they ever been bitten by fleas inside their home?

Objective:

Students will be able to identify if their companion animal has fleas and recognize potential flea breeding areas in and around their homes.

TEKS:

Science

2.1a, 2.1b, 2.2a, 2.2b, 2.3a, 2.3b, 2.4a, 2.4b, 2.6a, 2.6b, 2.8a, 2.8b, 2.9a, 2.9b
3.1a, 3.1b, 3.2a, 3.2b, 3.3a, 3.3b, 3.5a, 3.5b, 3.8a, 3.8b, 3.9a, 3.9b

Materials:

Handouts of passage and color page for locating possible flea habitats.
Overhead copy of the passage.

My pet has fleas...how did that happen?

How do I know if I have fleas in my house?

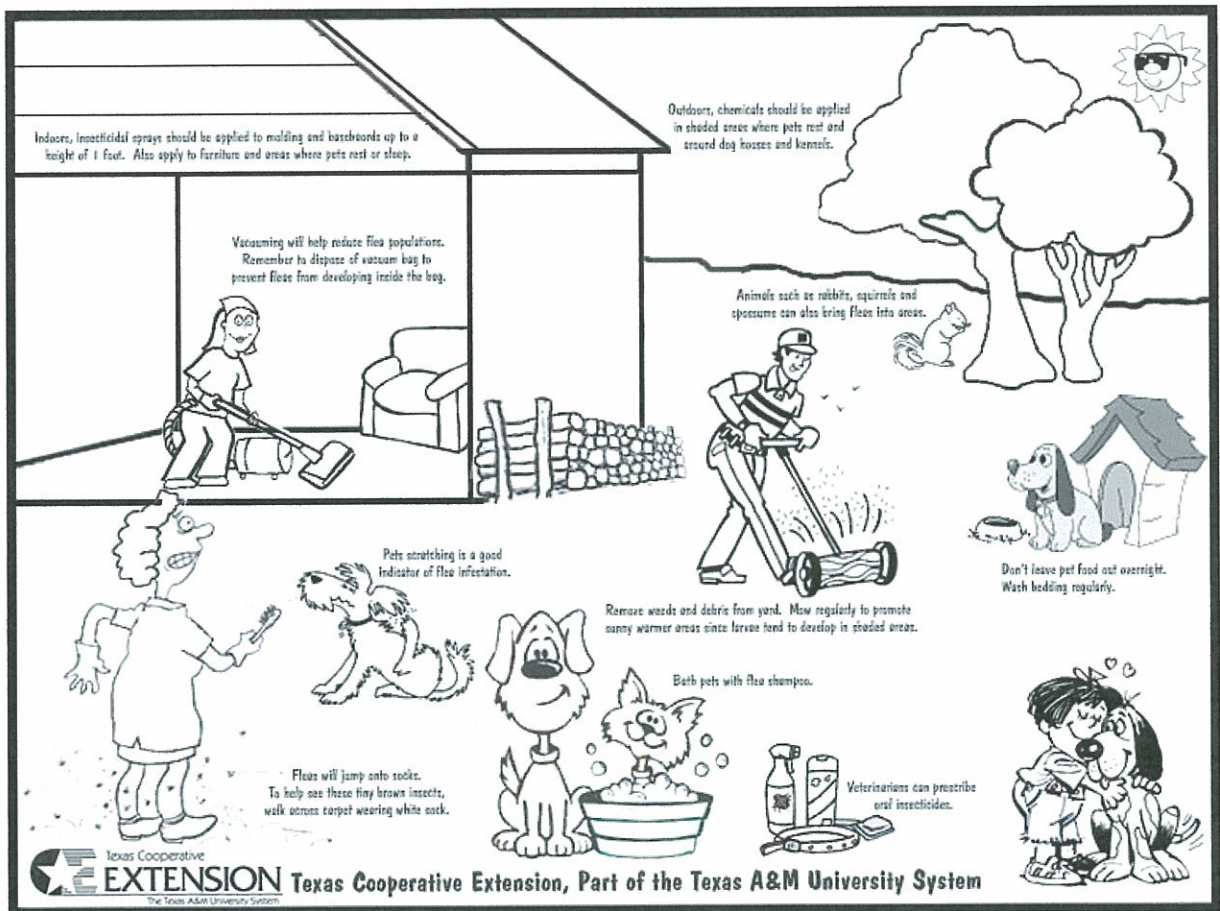
Fleas reproduce at a rapid rate so if one flea is encountered, there are probably many in the area. One way to detect flea infestations is to walk around your house in white socks. To determine if fleas are present in your home, walk across a carpeted floor while wearing white socks help see these tiny brown insects. The dark-colored fleas will stand out from the white background of the sock as the fleas jump onto the socks. If fleas are present in the house, **integrated pest management (IPM)** approach to controlling these insects can be taken in to decrease the flea population.

Also a pet scratching is a good indicator of flea infestation. Tiny specks of dried blood may also be found on pet bedding, which is another sign of flea infestation. Flea eggs may also be seen, especially if the eggs are found on a dark colored background. A flea egg is commonly mistaken for a grain of sand. However the flea eggs are filled with liquid. This makes flea eggs easily distinguished from grains of sand, when they are crushed between fingers. Remember that finding an adult flea means there are also eggs and larvae within the area. Therefore killing only the adult flea does not guarantee eliminating the entire flea population. If you have fleas inside take all pets to the veterinarian for medication that will help kill any fleas that jump on them.

How do they invade homes and structures?

The perfect environment for fleas is in areas that are well protected from rain, sun and have a temperature range between 70-90° F. These areas are usually under porches, decks, car ports, at the edges of woods, and in places where your pets lay down outdoors. Fleas can enter the home in many ways, even if companion animals are never or rarely outside. Fleas have the ability to jump from surrounding areas and land on humans or companion animals. A person does not have to own a pet to have fleas in and around their house. Other animals such as rabbits, squirrels, opossums can bring the fleas into areas. This can allow fleas to begin an infestation in and around structures.

Exercise: Locate and Color Potential Areas of Flea Infestations



Wrap Up:

1. What is one way to detect a flea infestation in your home? **The dark-colored fleas will stand out on white socks, when the adult fleas jump onto the socks.**
2. Will killing the adult flea eliminate the flea infestation? Why? **No, there are probably flea larvae and eggs still in the area.**
3. Can flea eggs be seen? **Yes, they resemble a grain of sand.**
4. What do flea eggs look like? **They look like a grain of sand, but are filled with liquid.**
5. What temperature range do fleas prefer to live? **They prefer temperatures between 70-90° F.**
6. Name some animals that fleas can live on. **Besides dogs and cats, fleas can be found on other furred animals such as rabbits, squirrels and opossums.**

Enhancement Activity: I Spy Potential Flea Habitats

The students may walk around their homes and complete the “I Spy Potential Flea Habitats” worksheet. This worksheet lists areas around the home that could serve as potential places for flea infestations, such as in protected areas or if a wild animal is seen roaming around structures or entering structures. The students can complete this activity with a parent/guardian or the student can complete the worksheet alone and then share it with their parent/guardian upon completion. The students will then report two areas where they were able to locate possible flea habitats and ways to eliminate those habitats, the following class period.

Activity: "I SPY POSSIBLE FLEA HABITATS"

Areas of Possible Infestations

1.

2.

3.

4.

5.

Ways to Eliminate Fleas

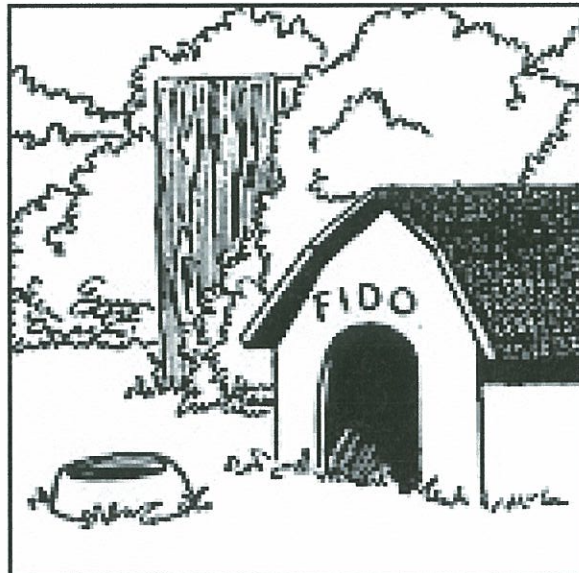
1.

2.

3.

4.

5.



Lesson 4: What Makes a Flea Dangerous?

Approximate time: 25 minutes

Overview:

Students will read the passage regarding to diseases fleas may cause in order to help them understand the dangers of these insects to humans.

Ask the students before reading the passage: What makes something or someone dangerous? Why they think fleas might be dangerous? Do they think fleas carry disease? Should they protect themselves from fleas? How can they protect themselves from fleas?

Objective:

Students will be able to identify why a flea is dangerous and list some diseases a flea can transmit.

TEKS:

Science

2.1a, 2.1b, 2.2a, 2.2b, 2.3a, 2.3b, 2.4a, 2.4b, 2.6a, 2.6b, 2.8a, 2.8b, 2.9a, 2.9b

3.1a, 3.1b, 3.2a, 3.2b, 3.3a, 3.3b, 3.5a, 3.5b, 3.8a, 3.8b, 3.9a, 3.9b

Materials:

Handouts of passage and word scramble and maze.

Overhead copy of the passage.

Why are fleas so dangerous?

Problems with fleas

Fleas are irritating to all animals, since they will feed on any warm-blooded animal. After a flea bites, the skin becomes irritated and inflamed. In addition, flea bites will cause itching. Sometimes their bites will cause some people and pets to suffer from flea allergy **dermatitis**. This dermatitis can cause intense itching, hair loss, and lead to **secondary infection**. Also biting fleas can cause **anemia** in young, older or ill pets, which causes pale gums, weakness, and **lethargy**.

Many fleas are carriers for **parasites** and disease. Fleas can transmit **tapeworms** to pets, which can produce a shaggy coat, mild diarrhea, weight loss, and sometimes seizures. Tapeworm eggs are normally ingested by flea larva as they feed on the ground. Once the larva has ingested the tapeworm egg, the tapeworm continues to develop inside the flea larva. Once the adult flea emerges from the cocoon, the adult will have the tapeworm parasite. If this infected flea lands on your pet, your pet can eat the flea while grooming. If the pet eats the infected flea, your pet will now have the tapeworm parasite.

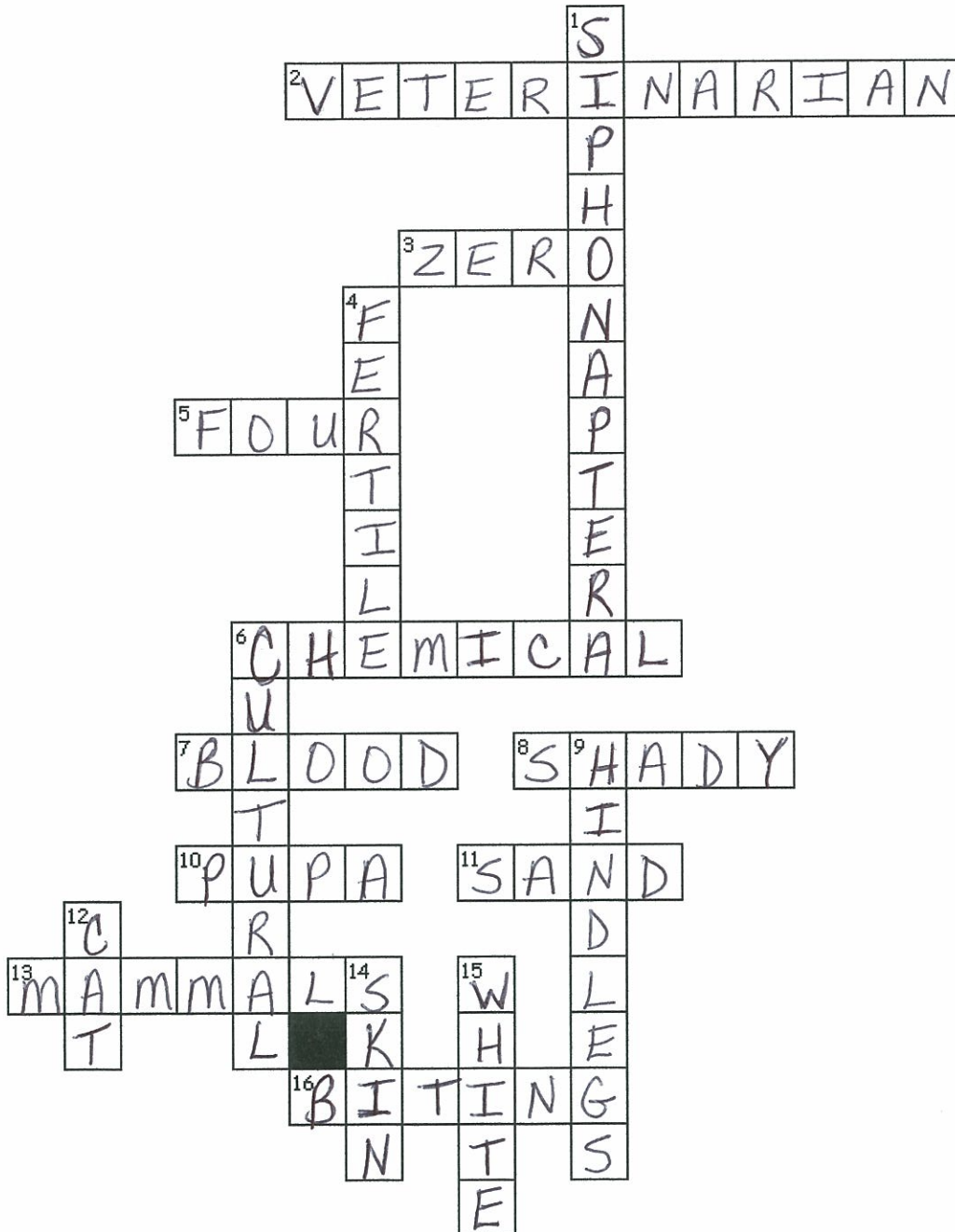
Fleas can also transmit diseases such as **plague** and **murine typhus**. Fleas found most commonly on rodents have the ability to transmit plague to cats and to humans. Plague causes fever, swollen lymph nodes, and sometimes death. There are two types of plague,

pneumonic plague and **bubonic plague**. Fleas or an infected animal can spread bubonic plague. Symptoms of bubonic plague include fever, headache, and painful, swollen **lymph nodes**. Pneumonic plague causes pneumonia. Although plague can be fatal to both humans and animals, it is treatable with antibiotics if diagnosed early. Also a plague vaccine is available for special groups at very high risk. Murine typhus is a common disease in south Texas. Often the disease is mild and unnoticed; however, it can be severe and sometimes deadly. Infected rat fleas **excrete** the bacteria, while sucking blood from the host. This causes **contamination** of the bite site and other fresh wound sites. Symptoms of murine typhus include headache, backaches, high fever (around 105°F), and a rash. Antibiotics can also be prescribed to cure murine typhus.

Early **diagnosis** and treatment give humans the best chance of recovery from these and other flea transmitted diseases. By keeping fleas away from your pet, your pet will remain healthy.

Exercise: Crossword

Fighting Off Fleas!!!



Across

2. Type of doctor pets are taken to
3. Fleas have this many wings
5. The number of stages in a flea lifecycle
6. The use of insecticides is what type of control
7. Both male and female fleas feed on _____.
8. Fleas prefer to breed in this area
10. Flea larva develops into _____.
11. Flea eggs sometimes look like grains of _____.
13. Fleas can live on birds and _____.
16. Fleas have this type of mouthpart

Down

1. Fleas are found in this Order
4. Female fleas need blood to produce what type of eggs
6. These methods for controlling fleas result in changing the environment
9. The body part that allows the flea to jump
12. The most common type of flea
14. Flea larvae feed on dried blood and _____.
15. The color of socks used to detect a flea infestation

Word Bank:

Zero
Sand
Six
Cultural
Hindlegs
Itch
Fertile

Blood
Fertile
Chemical
Cat
Shady
Four
Disease

Veterinarian
Mammals
White
Pupa
Skin
Biting
Siphonaptera

