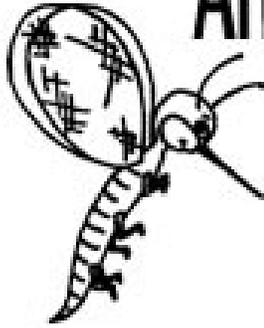


CONTROLLING MOSQUITOES AROUND YOUR HOME



Jeffery K. Tomberlin, Ph.D.
Assistant Professor & Extension Specialist
1229 North U.S. Hwy 281
Stephenville, Texas 76401
Phone: 254.968.4144
Email: jktomberlin@ag.tamu.edu

Kimberly Engler
Program Specialist - Urban IPM
17360 Coit Road
Dallas, Texas 75252
Phone: 972.952.9221
Email: k-engler@tamu.edu

Preface

MOSQUITOES are a diverse group of flies that occur throughout Texas. The biology of these insects varies between species; however it is safe to say that one common feature between species is their ability to locate and bite people. Accordingly, mosquitoes are known to transmit a variety of pathogens that result in diseases, such as West Nile Virus, Eastern Equine Encephalitis, and Yellow Fever.

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



Table of Content

Preface		Page 2	
<u>Lesson 1</u>			
Exercise 1:	Reading	Page 4	
	Supplemental: Mosquito Double Puzzle	Page 6	
	Exercise 2:	Magic Mosquito Matching	Page 7
<u>Lesson 2</u>			
Exercise 3:	Word Find	Page 9	
	Supplemental: Maze	Page 10	
<u>Lesson 3</u>			
Exercise 4:	Coloring Page	Page 11	
<u>Lesson 4</u>			
Exercise 5:	Cross Word puzzle	Page 13	

Lesson 1: Exercise 1

Reading

Mosquitoes are insects known as flies. Mosquitoes live in Texas, and they are active during the day and night. Both male and female mosquitoes feed on nectar produced by flowers. Male mosquitoes do not bite people. However, female mosquitoes bite people and feed on blood.

Once a female mosquito has bitten a person, she will lay her eggs somewhere water is present. The mosquito eggs hatch into larvae known as tumblers. The larvae feed on bits of food found in the water. Once they have fed for two weeks, the larvae will become pupae. Adult mosquitoes will emerge from the pupae.

There are many ways to stop mosquitoes from biting people. Mosquitoes do not like to lay their eggs in clean water. Therefore, it is important to empty or change the water in cans, water dishes for dogs and cats and bird baths. This will keep the water clean. Another way to keep mosquitoes away is to keep doors and windows in a house closed. This will keep mosquitoes out of your home.

Questions

1. What kind of insect is a mosquito?
2. What do male and female mosquitoes like to eat?
3. Where do mosquitoes lay their eggs?
4. What are the larvae of mosquitoes also known as?
5. What do mosquito larvae feed on?
6. How can you prevent mosquitoes from biting people?

Supplemental to Lesson 1: Exercise 1 Mosquito Double Puzzle

LYF	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">37</td><td style="text-align: center;">26</td><td></td></tr> </table>				37	26																			
37	26																								
BARCON X OIDEID	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td style="text-align: center;">10</td><td></td><td></td></tr> </table>								10			<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">16</td><td style="text-align: center;">24</td><td style="text-align: center;">39</td><td></td><td></td><td style="text-align: center;">3</td></tr> </table>							16	24	39			3	
		10																							
16	24	39			3																				
LAEVAR	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td></td><td style="text-align: center;">23</td><td></td></tr> </table>									23															
			23																						
DEASEIS	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td style="text-align: center;">8</td><td style="text-align: center;">18</td><td></td><td></td><td></td><td style="text-align: center;">36</td></tr> </table>									8	18				36										
	8	18				36																			
SEIBT	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td style="text-align: center;">19</td><td style="text-align: center;">41</td><td style="text-align: center;">11</td><td></td></tr> </table>							19	41	11															
	19	41	11																						
TIGNHCI	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td style="text-align: center;">2</td><td></td><td></td><td></td><td style="text-align: center;">20</td></tr> </table>										2				20										
		2				20																			
NISWG	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">1</td><td></td><td></td><td style="text-align: center;">40</td><td></td></tr> </table>						1			40															
1			40																						
TRNAEC	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">4</td><td style="text-align: center;">27</td><td></td><td style="text-align: center;">30</td><td style="text-align: center;">35</td><td style="text-align: center;">33</td></tr> </table>							4	27		30	35	33												
4	27		30	35	33																				
GESG	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">32</td><td></td><td></td><td style="text-align: center;">6</td></tr> </table>					32			6																
32			6																						
ODOLB	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">28</td><td style="text-align: center;">38</td><td style="text-align: center;">5</td><td></td><td></td></tr> </table>						28	38	5																
28	38	5																							
DUTAL	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td style="text-align: center;">7</td><td></td><td style="text-align: center;">21</td></tr> </table>								7		21														
		7		21																					
LIAVSA	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">12</td><td></td><td></td><td></td><td></td><td></td></tr> </table>							12																	
12																									
SATWE	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td></td><td style="text-align: center;">9</td><td></td></tr> </table>									9															
			9																						
NANTAENE	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td style="text-align: center;">34</td><td></td><td></td><td style="text-align: center;">17</td><td style="text-align: center;">13</td><td></td></tr> </table>											34			17	13									
		34			17	13																			
PAUPE	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">25</td><td></td><td style="text-align: center;">22</td><td></td><td style="text-align: center;">15</td></tr> </table>						25		22		15														
25		22		15																					
TAWRE	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td></td><td></td><td style="text-align: center;">31</td><td style="text-align: center;">29</td><td style="text-align: center;">14</td></tr> </table>								31	29	14														
		31	29	14																					

<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">1</td><td style="text-align: center;">2</td><td style="text-align: center;">3</td><td style="text-align: center;">4</td></tr> </table>					1	2	3	4	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px; text-align: center;">M</td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px; text-align: center;">Q</td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">5</td><td style="text-align: center;">6</td><td style="text-align: center;">7</td><td style="text-align: center;">8</td><td style="text-align: center;">9</td><td style="text-align: center;">10</td><td style="text-align: center;">11</td><td style="text-align: center;">12</td><td></td><td></td><td></td><td></td></tr> </table>	M		Q										5	6	7	8	9	10	11	12					<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">13</td><td style="text-align: center;">14</td><td style="text-align: center;">15</td></tr> </table>				13	14	15	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">16</td><td style="text-align: center;">17</td></tr> </table>			16	17	<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">18</td><td style="text-align: center;">19</td><td style="text-align: center;">20</td><td style="text-align: center;">2</td><td style="text-align: center;">21</td><td></td></tr> </table>							18	19	20	2	21	
1	2	3	4																																																							
M		Q																																																								
5	6	7	8	9	10	11	12																																																			
13	14	15																																																								
16	17																																																									
18	19	20	2	21																																																						
<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">22</td><td style="text-align: center;">23</td><td style="text-align: center;">24</td><td style="text-align: center;">25</td><td style="text-align: center;">26</td><td style="text-align: center;">27</td><td></td></tr> </table>								22	23	24	25	26	27		<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">28</td><td style="text-align: center;">29</td><td style="text-align: center;">30</td><td style="text-align: center;">31</td><td style="text-align: center;">32</td><td style="text-align: center;">33</td><td></td></tr> </table>								28	29	30	31	32	33		<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px; text-align: center;">K</td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">34</td><td style="text-align: center;">35</td><td style="text-align: center;">36</td><td></td></tr> </table>			K		34	35	36		<table border="1" style="margin: auto;"> <tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr> <tr><td style="text-align: center;">37</td><td style="text-align: center;">38</td><td style="text-align: center;">39</td><td style="text-align: center;">40</td><td style="text-align: center;">2</td><td style="text-align: center;">41</td></tr> </table>							37	38	39	40	2	41							
22	23	24	25	26	27																																																					
28	29	30	31	32	33																																																					
		K																																																								
34	35	36																																																								
37	38	39	40	2	41																																																					

Unscramble each of the clue words, then copy the letters in the numbered cells to other cells with the same number.

Word Bank:		
Itching	Eggs	Important
Bites	Water	Flight
Blood	Carbon dioxide	Pupae
Nectar	Sweat	Saliva
Adult	Antennae	Larvae
Wings	Nuisance	Humans

Lesson 1: Exercise 2

Magic Mosquito Matching

Mosquitoes can be found everywhere in Texas. Not only are they a **nuisance**, but they are considered the most **important** insect to transmit **disease** to **humans**.

- ***How do mosquitoes develop?*** Mosquitoes have four distinct life stages: egg, larva, pupa, and adult. Mosquito eggs are laid either singly or in cluster on the water surface or in dry areas that are subject to flooding. The **eggs** will hatch into larvae. The larval stage will only live in **water** and they feed on microscopic plants, animals, and other organic debris. The pupa stage is the stage between the mosquito larva and adult. The **pupae** live in water and they do not feed. The **adult** stage has **wings** and both the male and female mosquito feeds on **nectar** and other plant juices. However, the female mosquito also needs a blood meal to produce eggs.
- ***How do mosquitoes know to bite us?*** Female mosquitoes use both visual cues and chemical cues to locate us. Visual cues are used **flight** and then chemicals cues, such as **carbon dioxide** are detected by the mosquito's antennae as they get closer to us. Skin temperature, amount of **sweat** produced, perfumes, soaps, lotions, and hair care products may also attract mosquitoes to certain people.
- ***Why does the bite itch?*** When a female mosquito bites, she injects **saliva** to prevent your **blood** from clotting. This saliva causes both swelling and **itching** for a few hours after **bites** occur.

By reducing standing water around your home, you will reduce the mosquito populations in your yard.

Directions: Match the terms that are related in each column by drawing a connecting line.

Right Column

Mosquito
Itch
Water
Males
DEET
Egg, Larva, Pupa, Adult
Carbon Dioxide, Heat
Females
Buzz
Summer
Feed

Left Column

Hot Weather
Blood
Lifecycle
Bite
Sound
Repellent
Nectar
Attractant
Day/Night
Breeding Site
Fly



Lesson 2: Exercise 3

Word Find

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

MOSQUITO
FLY
DIPTERA
WATER

BITE
BLOOD
DISEASE
PROBOSCIS

TUMBLER
PUPA
AEDES
SUGAR

EGG
LARVA
CULEX

A **mosquito** is a **fly**, which is found in the Order **Diptera**. They lay their eggs in pools of **water**. They have a complete life cycle with the following stages, **egg**, **larva**, **pupa**, which is know as the **tumbler**, and adult. They are annoying for the buzzing sound they make as well as their bites. Mosquitoes use their **proboscis**, or mouthparts, to bite people. Adult female mosquitoes **bite** people, feed on **blood**, and can transmit pathogens like the West Nile Virus that result in a **disease**. Male mosquitoes do not bite people. They also feed on the nectar of plants as a **sugar** source. There are many types of mosquitoes including *Aedes* and *Culex*.

Dark colors capture heat and make most people more attractive to mosquitoes.

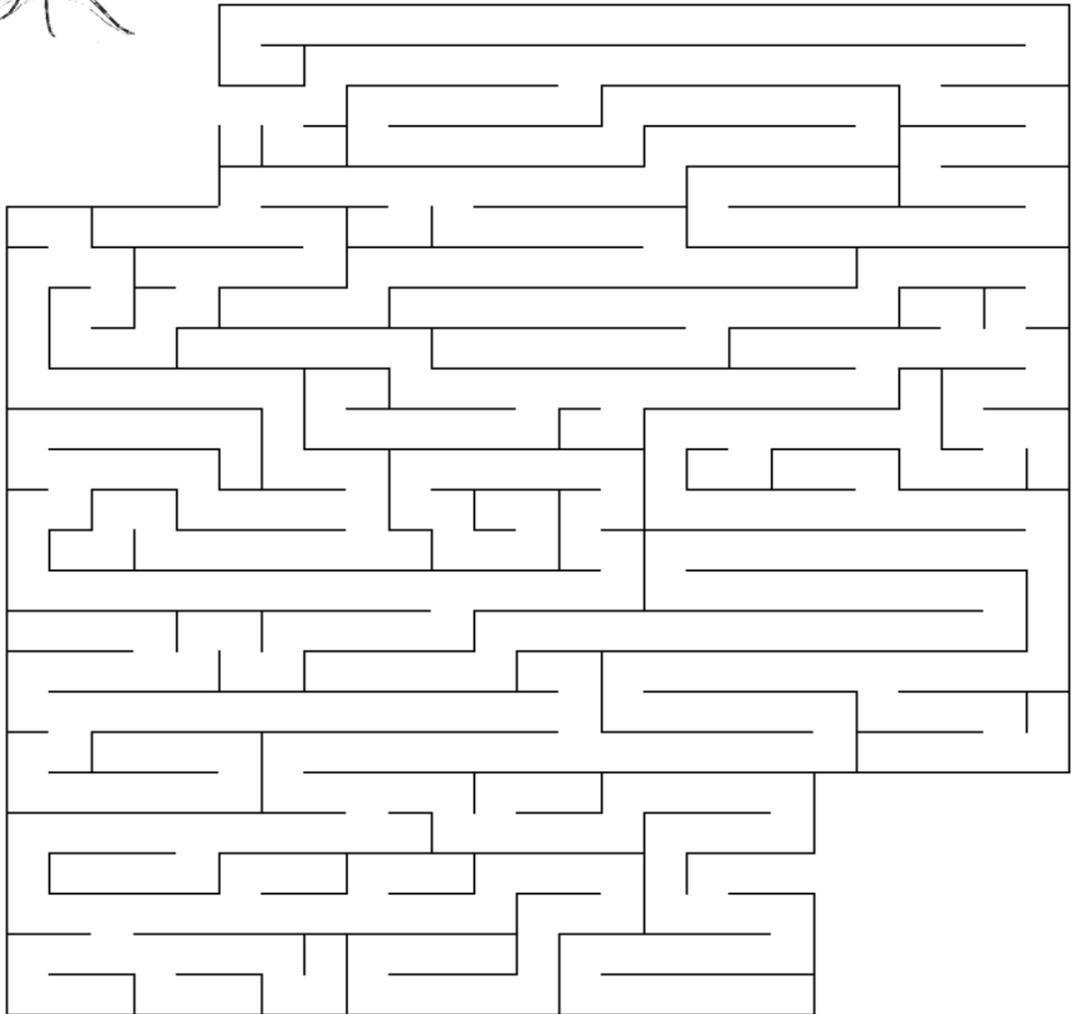
Spiders, bats, birds and dragonflies are predators of



Supplemental to Lesson 2: Exercise 3
Maze

Help Mazzie get her blood meal

Mosquitoes rely on sugar as their main source of energy.



A mosquito can fly 1 to 1.5 miles an hour.

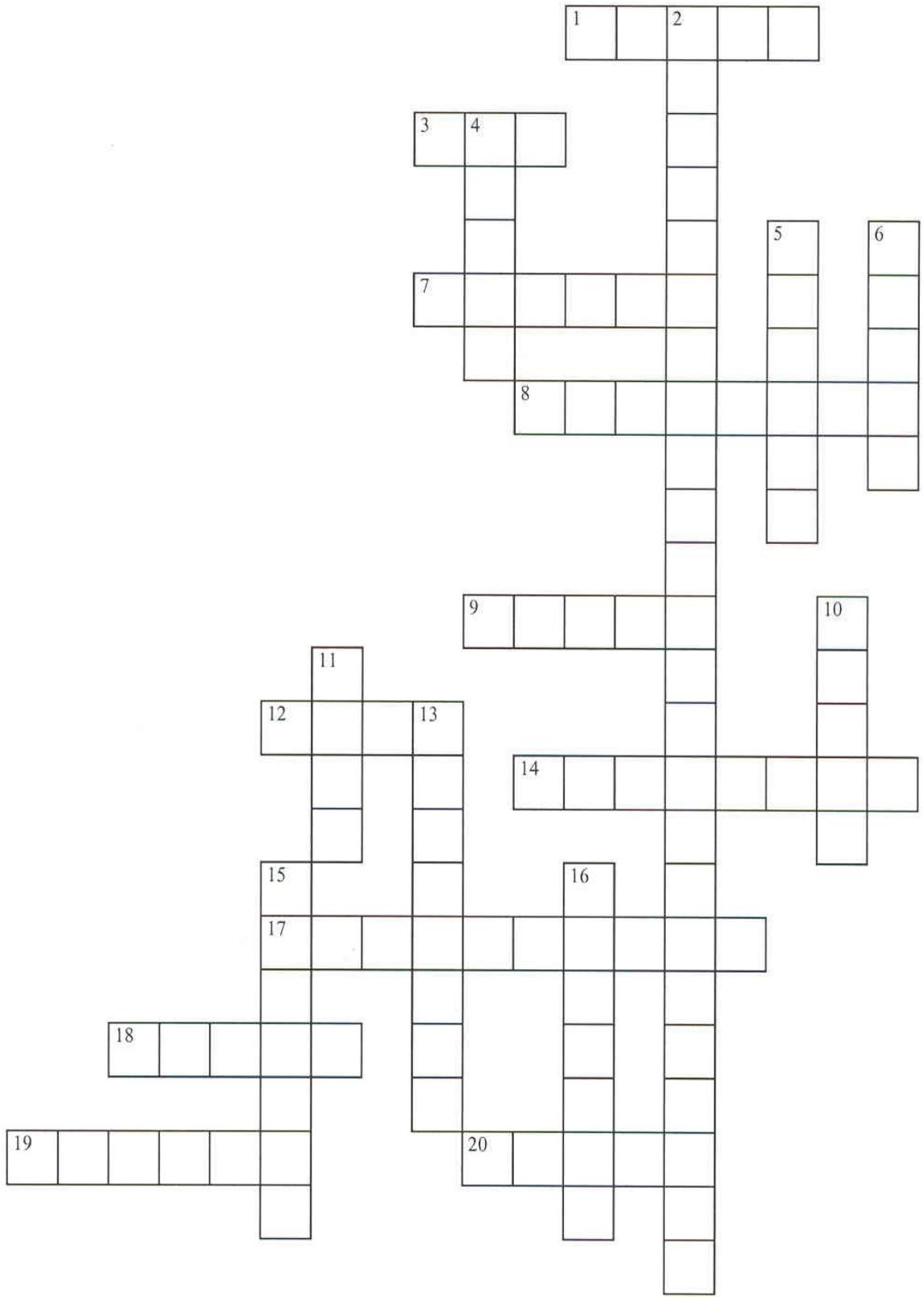
Mosquitoes rely on sugar as their main source of energy.

Lesson 4: Exercise 5

Cross Word Puzzle

INTEGRATED PEST MANAGEMENT (IPM) is the use of chemical, cultural, and biological control methods to suppress insect pest species, such as mosquitoes. **Chemical** strategies include insecticide sprays. Many of these insecticides are sprayed from trucks or airplanes. However, the over-use of insecticides with time can result in their not being able to suppress mosquito populations. **Cultural** control can be defined as anything you can do to prevent mosquito populations from growing. Examples of cultural control methods include dumping water from cans, tires, and other water receptacles. **Biological** control can be defined as using what Nature already has provided to control mosquito populations. Examples of biological control include, frogs and birds that eat mosquitoes.

Using an integrated pest management approach to suppress mosquito populations is the best way.



Questions or statements:

ACROSS

- 1 Mosquitoes are _____
- 3 Mosquitoes have this many wings
- 7 The sugar source used by male and female mosquitoes is found in plant _____.
- 8 These methods for controlling mosquitoes result in changing the environment so mosquito populations will not grow.
- 9 Mosquito larvae turn into _____.
- 12 Female mosquitoes are attracted to their hosts by _____.
- 14 These methods use insecticides to control mosquitoes.
- 17 These methods use what Nature has provided to control mosquitoes for example, frogs and birds.
- 18 Female mosquitoes feed on _____.

DOWN

- 2 This method should be used to control mosquito populations. Biological, chemical and cultural methods together make up this method.
- 4 Mosquitoes lay their eggs in _____.
- 5 The wings of the mosquito are found on this body part.
- 6 Mosquito pupae turn into _____.
- 10 Male mosquitoes feed only on _____.
- 11 The mouthparts of the mosquito are found on this body part.
- 13 Mosquito pupae are also called _____.
- 15. The stomach of the mosquito is found in this body part.
- 16. Flies are in the order _____.

Word Bank

- | | | | |
|----------|----------------------------|--------|-------|
| Flies | Diptera | Pupae | Water |
| Tumblers | Blood | Head | Two |
| Thorax | Nectar | Sugar | |
| Heat | Three | Larvae | |
| Chemical | Cultural | | |
| Chemical | Integrated Pest Management | | |
| Abdomen | Adult | | |

