

# **Mosquitos and You!**

## **Mosquito Control and Prevention**



### **Teacher's Guide**

State of Florida Science Sunshine State Standards Grades PreK – 5

State of Florida Health Sunshine State Standards Grades PreK – 5

Produced by Volusia County Health Department

Mosquitos and You!  
Mosquito Control and Prevention

Produced and Created by:  
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**Project Goals:**

This project was designed to teach school-aged children effective primary mosquito prevention techniques such as removal of breeding habitat and community-wide control measures; and personal protective measures including use of appropriate clothing, screening, and repellants.

The project includes a training CD for elementary aged children and workbooks and Teacher's Guide.

**Objectives:**

- The student will be able to identify stages of the Mosquito Cycle.
- The student will be able to name some ways to effectively protect themselves from mosquito bites.
- The student will be able to identify possible mosquito breeding places and how to attempt to eliminate them in their own surroundings.
- The student will be familiar with the following virus and their potential harm to people and pets:
  - West Nile Virus
  - Eastern Equine Encephalitis
  - St. Louis Encephalitis
  - Malaria

The following Sunshine State Standards can be linked to this project:

## **State of Florida –Science Sunshine State Standards Grades PreK – 2**

### **Processes of Life**

#### **Standard 1:**

**The student describes patterns of structure and function in living things. (SC.F.1.1)**

1. knows the basic needs of all living things.
2. knows how to apply knowledge about life processes to distinguish between living and non-living things.
3. describes how organisms change as they grow and mature.
4. understands that structures of living things are adapted to their function in specific environments.
5. compares and describes the structural characteristics of plants and animals.

#### **Standard 2:**

**The student understands the process and importance of genetic diversity. (SC.F.2.1)**

1. knows that living things have offspring that resemble their parents.
2. knows that there are many different kinds of living things that live in a variety of environments.

### **How Living Things Interact with Their Environment**

#### **Standard 1:**

**The student understands the competitive interdependent, cyclic nature of living things in the environment. (SC.G.1.1)**

1. knows that environments have living and non-living parts.
2. knows that plants and animals are dependent upon each other for survival.
3. knows that there are many different plants and animals living in many different kinds of environments (e.g., hot, cold, wet, dry, sunny, and dark).
4. knows that animals and plants can be associated with their environment by an examination of their structural characteristics.

#### **Standard 2:**

**The student understands the consequences of using limited natural resources. (SC.G.2.1.)**

1. knows that if living things do not get food, water, shelter, and space, they will die.
2. knows that the activities of humans affect plants and animals in many ways.

## Health Education

### Standard 1:

**The student comprehends concepts related to health promotion and disease prevention. (HE.A.1.1)**

1. knows names of body parts.
2. understands positive health behaviors that enhance wellness.
3. understands the various responsibilities of family members (e.g., mother, father, aunt, grandparent, guardian, and sister) for health promotion and disease prevention.
4. recognizes environmental health problems and understands possible solutions.
5. identifies common health problems of children and possible ways to prevent these problems.
6. understands why health problems should be recognized and treated early.
7. recognizes that injuries may be prevented.
8. recognized the relationship between physical and emotional health.
9. classifies food and food combinations according to the Food Guide Pyramid.

### Standard 2:

**The student knows how to access valid health information and health-promoting products and services. (HE.A.2.1)**

1. knows sources of health information (e.g., people, places, and products) and how to locate them.
2. knows the meaning of warning labels and signs on hazardous substances.
3. identifies advertisements for health products.

## Responsible Behavior

### Standard 1:

**The student knows health-enhancing behaviors and how to reduce health risks. (HE.B.1.1)**

1. knows and practices good personal health habits.
2. identifies safe and unsafe behaviors.
3. knows positive ways to handle anger.
4. knows and practices ways to prevent injuries.
5. distinguishes between threatening and non-threatening environments.
6. demonstrates methods of avoiding threatening situations and how to seek help in threatening situations.

### **Standard 2:**

#### **The student analyzes the influence of culture, media, technology, and other factors on health. (HE.B.2.1)**

1. recognizes the ways in which the media, technology and other sources provide information about health.
2. recognizes that individuals have different cultural backgrounds that impact health practices.
3. knows and accepts the differences of people with special health needs.

### **Standard 3:**

#### **The student knows how to use effective interpersonal communication skills that enhance health. (HE.B.3.1)**

1. knows the various kinds of verbal and nonverbal communication (e.g., hand gestures and facial expressions).
2. knows the skills needed to be a responsible friend and family member (e.g., doing chores and helping others).
3. knows how to use positive communication skills when expressing needs, wants, and feelings.
4. knows various ways of communicating care and consideration of others (e.g., sharing and saying “please” and “thank you”).
5. listens attentively (e.g., does not talk while others are talking).

6. knows refusal skills to use in potentially harmful or dangerous situations (e.g., refusing to ride a bike without a helmet).
7. knows various ways in which to resolve conflict using positive behavior.
8. identifies healthy ways to handle feelings.

## **Advocate and Promote Health Living**

### **Standard 1:**

#### **The student knows how to use goal-setting and decision making skills that enhance health (HE.C.1.1)**

1. identifies health problems that require the help of a trusted adult (e.g., child abuse).
2. recognizes that decisions about personal behavior may be healthy or unhealthy (e.g., obeying pedestrian rules)

### **Standard 2:**

#### **The student knows how to advocate for personal, family, and community health (HE.C.2.1)**

1. knows various ways to share health information (e.g., talking to peers about health snacks).
2. knows various ways to convey accurate health information and ideas to both individuals and groups.

3. knows the community agencies that support healthy families, individuals, and other communities.
4. knows methods for assisting others in making positive choices (e.g., about safety belts).
5. works with one or more people toward a common goal.

## State of Florida –Science Sunshine State Standards Grades 3 – 5

### The Nature of Science

#### Standard 1:

##### **The student uses the scientific processes and habits of mind to solve problems (SC.H.1.2)**

1. knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.
2. knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results.
3. knows that to work collaboratively, all team members should be free to reach, explain, and justify their own individual conclusions.
4. knows that to compare and contrast observations and results is an essential skill in science.
5. knows that a model of something is different from the real thing, but can be used to learn something about the real thing.

#### Standard 2:

##### **The student understands that most natural events occur in comprehensible, consistent patterns. (SC.H.2.2)**

1. understands that people, alone or in groups, invent new tools to solve problems and

- do work that affects aspects of life outside of science.
2. knows that data are collected and interpreted in order to explain an event or concept.
3. knows that before a group of people build something or try something new, they should determine how it may affect other people.
4. knows that through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.

### How Living Things Interact with Their Environment

#### Standard 1:

##### **The student understands the competitive interdependent, cyclic nature of living things in the environment. (SC.G.1.2)**

1. knows ways that plants, animals, and protists interact.
2. knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.
3. knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.
4. knows that some organisms decompose dead plants and animals into simple minerals



- and nutrients for use by living things and thereby recycle. Matter.
5. knows that animals eat plants or other animals to acquire the energy they need for survival.
  6. knows that organisms are growing, dying, and decaying and that new organisms are being produced from the materials of dead organisms.
  7. knows that variations in light, water, temperature, and soil content are largely responsible for the existence of different kinds of organisms and population densities in an ecosystem.

## State of Florida – Health Education Sunshine State Standards Grades 3 – 5

### Health Literacy

#### Standard 1:

**The student comprehends concepts related to health promotion and disease prevention. (HE.A.1.2)**

1. understands the functions of human body systems.
2. knows how personal health behaviors influence individual well-being.
3. knows the indicators of physical, mental, emotional, and social health during childhood.
4. understands how the family influences personal health.
5. knows the ways in which the environment impacts health.
6. knows the most common health problems of children.
7. knows why health problems should be detected and treated early.
8. knows how childhood injuries and illnesses can be prevented and treated early.
9. knows why illegal drugs should not be used and the consequences of their use.
10. knows the nutritional values of different foods.

#### Standard 2:

**The student knows how to access valid health information and health-promoting products and services. (HE.A.2.2)**

1. knows the characteristics of valid health information,

- products, and services.
2. knows how to locate resources from home, school, and community that provide valid health information.
3. knows how the media influence the selection of health information, products, and services.
4. knows criteria for selecting health resources, products, and services.
5. knows of the availability of stress-management resources in the home, school, and community and has access to them.

### Responsible Health Behavior

#### Standard 1:

**The student know health-enhancing behaviors and how to reduce health risks. (HE.B.1.2)**

1. knows the importance of assuming responsibility for personal health habits.
2. compares behaviors that are safe to those that are risky or harmful.
3. knows and uses stress-management skills.
4. uses strategies for improving or maintaining personal health.
5. knows strategies for avoiding threatening or abusive situations.
6. knows and practices basic techniques for medical emergencies.

## **Standard 2:**

### **The student analyzes the influence of culture, media, technology, and other factors on health. (HE.B.2.2)**

1. knows how the media influence thoughts and feelings about health behavior.
2. understands how information from school and family influences personal health behaviors.
3. knows the ways in which technology can influence personal health.
4. understands the role of culture, age, or gender differences in personal health practices (e.g., fitness activities and food preferences).

## **Standard 3:**

### **The student knows how to use effective interpersonal communication skills that enhance health. (HE.B.3.2)**

1. understands the relationship between verbal and nonverbal communication (e.g., body language).
2. knows the skills needed to be a responsible friend and family member (e.g., communication and sharing).
3. knows nonviolent, positive behaviors for resolving conflict (e.g., peer mediation).
4. knows various ways to communicate care, consideration, and acceptance of self and others (e.g., by cooperating).

5. exhibits attentive listening skills to enhance interpersonal communication.
6. knows refusal and negotiation to use in potentially harmful or dangerous situations (e.g., refusing to use illegal drugs).
7. knows the difference between negative and positive behaviors used in conflict situations (e.g., talking vs. hitting, passivity vs. action).
8. knows ways to manage grief caused by disappointment, separation, or loss (e.g., loss of a pet).

## **Advocate and Promote Healthy Living**

### **Standard 1:**

#### **The student knows how to use goal-setting and decision-making skills which enhance health. (HE.C.1.2)**

1. knows how to apply a decision-making process to health issues and problems (e.g., decision not to use tobacco products).
2. knows appropriate sources of information for making health-related decisions (e.g., talking to parents concerning growth and development issues).
3. knows various methods for predicting outcomes of positive health decisions (e.g., life expectancy).
4. knows how to make progress toward achieving a personal goal (e.g., by creating an action plan for individual wellness).

**Standard 2:**

**The student knows how to advocate for personal, family, and community health. (HE.C.2.2)**

1. knows various methods for communicating health information and ideas (e.g., through oral or written reports).
2. knows ways to effectively express feelings and opinions on health issues.
3. knows the community agencies that advocate healthy individuals, families, and communities (e.g., health department and volunteer agencies).
4. knows how to positively influence others to make positive choices.
5. knows various ways individuals and groups can work together.
6. knows how to enlist family, school, and community helpers to aid in achieving health goals.

## **Background Information:**

### **Mosquitos and Viruses:**

As the populations in Florida increases so does the threat of diseases, especially from mosquitos. Mosquitos in Florida carry four types of virus called arboviruses. These viruses are; St. Louis encephalitis (SLE), Eastern equine encephalomyelitis (EEE), Western equine encephalitis, and West Nile Virus (WN).

SLE is the most common of these diseases in Florida. In an average year, one to 10 cases of SLE are reported. EEE occurs sporadically in Florida. WN is newly reported in the state, but it is quickly becoming a health concern.

Many people may not even know they are infected with an arbovirus. When symptoms do occur (2-15 days from the bite of an infected mosquito), they may include fever, headache, fatigue, dizziness, weakness and confusion. WN may also cause rash or muscle weakness. People 50 and older tend to be more severely affected by SLE or WN viruses.

At this time, there are no human vaccines against SLE or EEE, although a WN vaccine is being developed.

SLE, EEE, and WN pass back and forth between birds and mosquitos. Mosquito control agencies located throughout the state monitor mosquito populations. In many areas, these agencies and county health departments also keep chicken flocks and monitor these chickens for evidence of exposure to arboviruses. Chickens make good sentinels because they do not get sick from these viruses or transmit them to people.

Dead birds are an indicator the WN virus may be in an area. Please report dead birds on the internet site [www.wildflorida.org/bird/](http://www.wildflorida.org/bird/) (or call your county health department or local Fish and Wildlife Conservation Commission office). Another indicator that WN or EEE may be present is through horses.

### **Arboviruses:**

What is a virus? Virus is a germ which sneaks into your system. Viruses have to live inside an animal or human. Once inside the host, they produce other viruses.

West Nile Virus: This virus originated in Africa near the Nile River. Mosquitos bit infected birds and in turn bit people. There is not vaccine for West Nile, at this time, however, a doctor can treat the systems. There is a vaccine for horses.

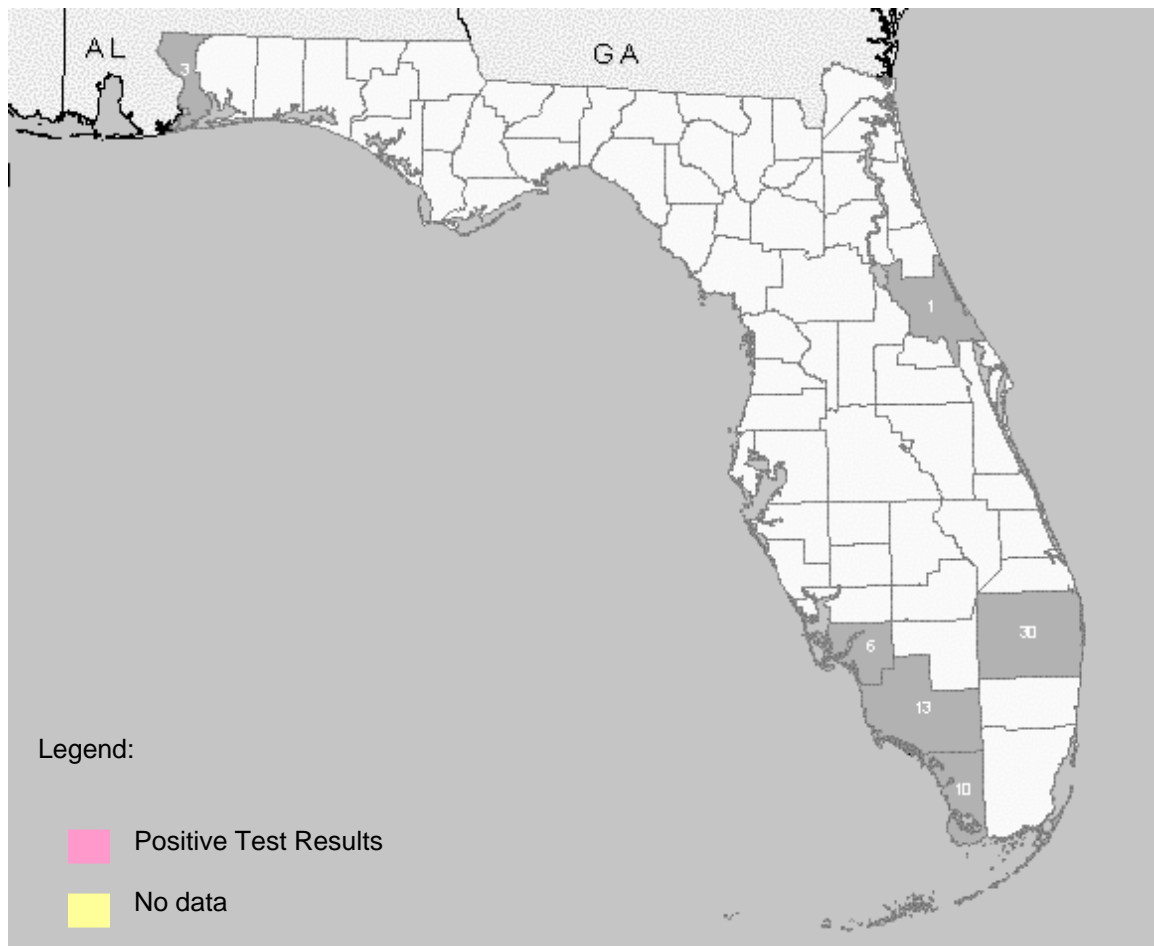
Eastern Equine Encephalitis: This virus is found in wild birds. This virus can be located along the eastern seaboard of the United States and is associated with horses. It is usually fatal in horses if they are not given a vaccine. There is no vaccine for humans.

St. Louis Encephalitis: It was discovered in St. Louis, Missouri in 1937. It is usually found in the mid west and eastern United States. Cold or flu like symptoms results if a person is bitten by an infected mosquito.

Culexnigripalpus: This type of mosquito is found in Florida. It infects birds and people and needs high humidity. It mainly flies at dawn and dusk.

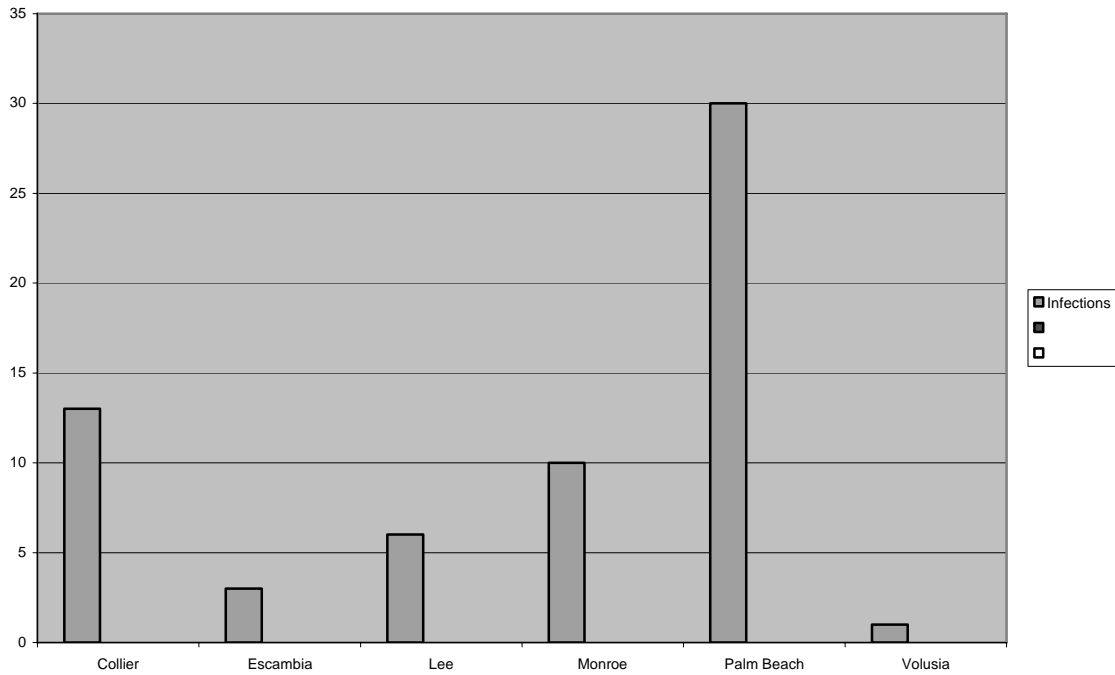
Malaria: This is the number one insect-borne disease to human in the world. Florida, however, has fewer than 100 cases.

### 2003 Cumulative Data



These maps reflect information for the 2003 West Nile Virus reporting season that has been submitted and verified to CDC through the week of April 9, 2004. These are the final USGS West Nile maps for the 2003 season.

## Cumulative Mosquito Infections by County – Florida, 2003

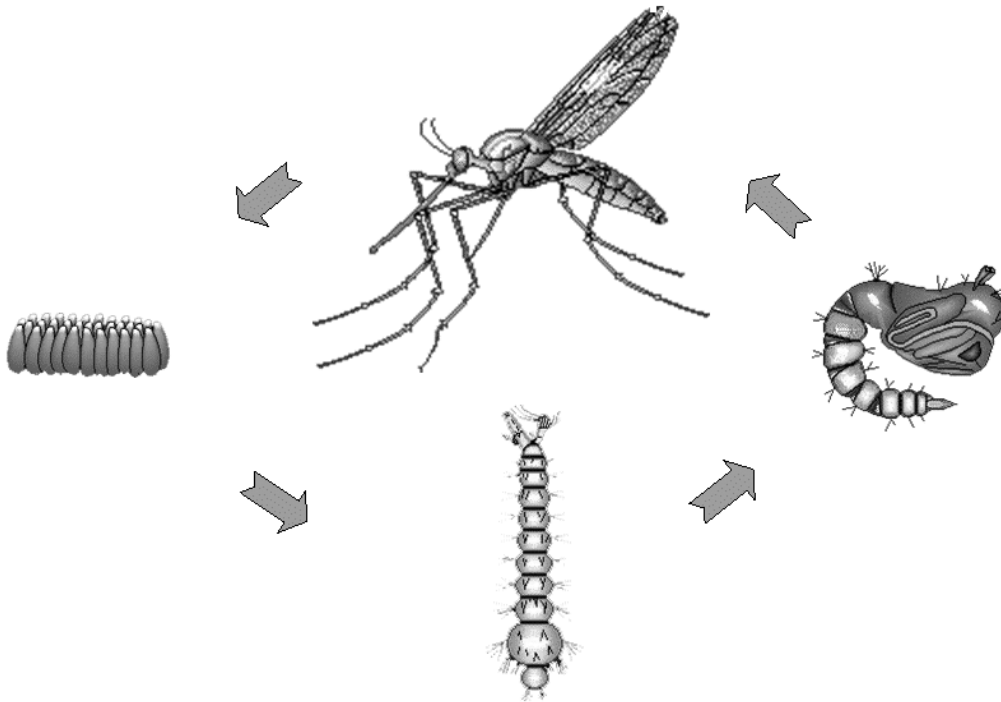


These maps reflect information for the 2003 West Nile Virus reporting season that has been submitted and verified to CDC through the week of April 9, 2004. These are the final USGS West Nile maps for the 2003 season.

## Mosquito Cycle:

There are four stages to mosquito reproduction.

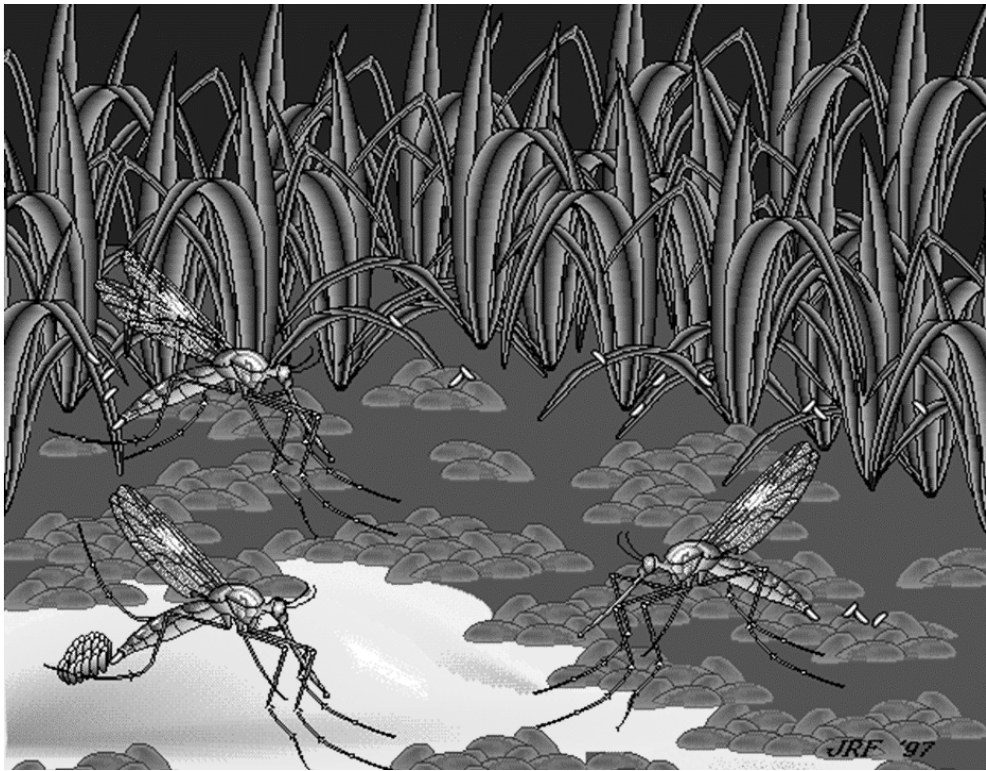
- Adult
- Egg Raft
- Larva
- Pupa





## Natural Habitats:

Natural habitats that promote breeding are ones that hold a week of water such as salt marches, mangroves, swamps, fresh water marshes, lakes, ponds, streams, rain pools, tree holes, bromeliads, pitcher plants and crab holes. Some man-made created mosquito habitats that hold water a week or more are storm water control ditches, swales, and storm water ponds. Also, mosquito larvae and pupa attach themselves to the roots of aquatic plants, water hyacinth, cattail and water lettuce.

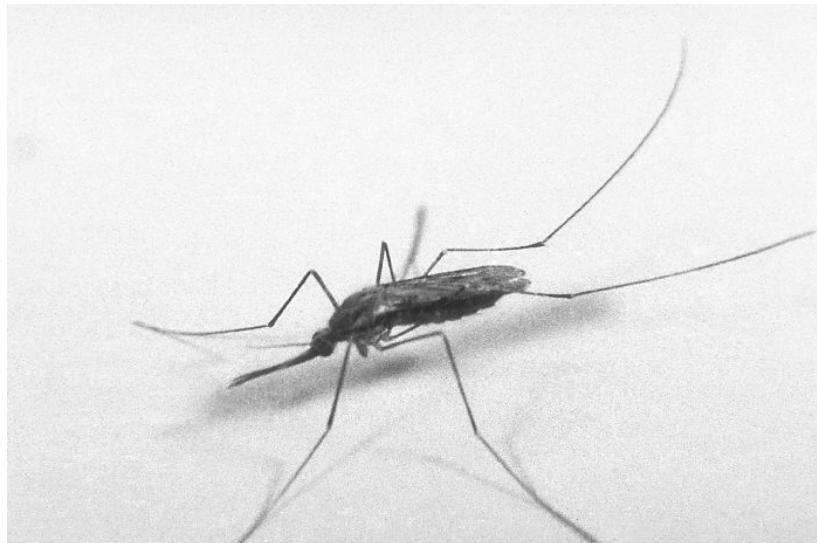


## **Prevention of Mosquito Bites:**

Due to the mild weather in Florida, outdoor activities extend from dawn to dusk. Prevention of mosquito bites is the key.

### **Five rules to follow for prevention of mosquito bites are:**

1. **Dawn to Dusk:** Avoid being outdoors during this time.
2. **Dress:** Wear protective clothing if you must be outdoors.
3. **DEET:** Use products containing DEET to prevent mosquito bites.
4. **Drain:** Drain containers such as wading pools, wheelbarrows, empty plant containers, garbage cans and their lids, birdbaths, rain gutters and other areas in the yard where water may collect undisturbed for a week or more.
5. **Screen:** Make sure house windows are closed and sealed with a screen.



**Culex nigripalpus: The Florida Mosquito**

**Other Links:**

[www.volusiahealth.com/eh](http://www.volusiahealth.com/eh)

[www.cdc.gov](http://www.cdc.gov)

[www.myflorida.com](http://www.myflorida.com)

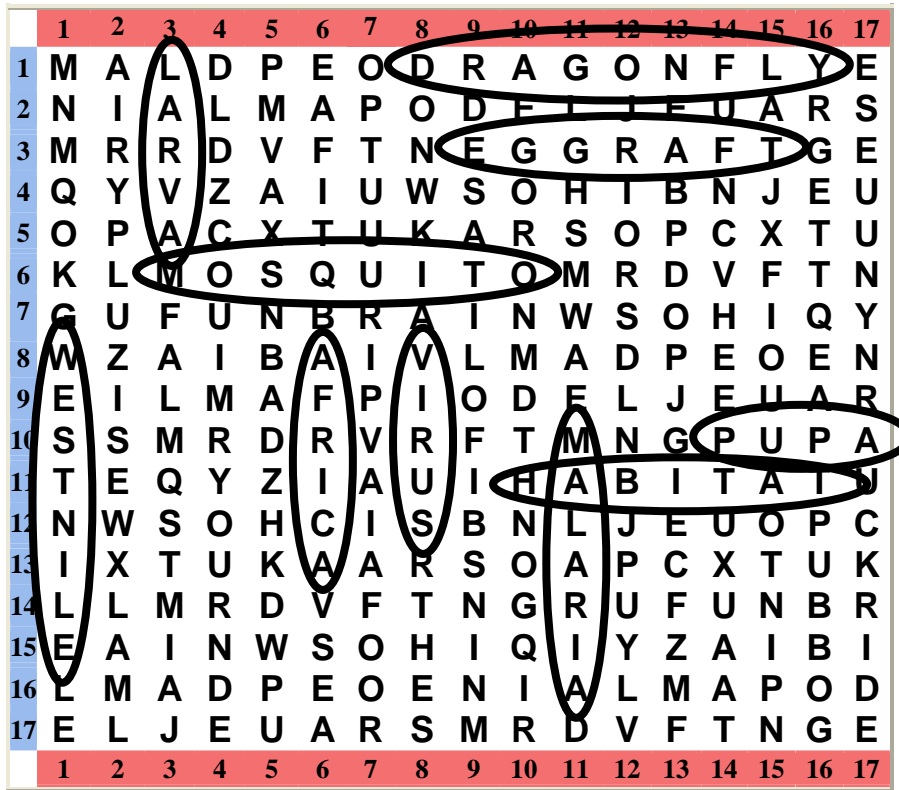
Answer Key: Kindergarten, First, and Second Grades

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**Mosquito Control and Prevention Booklet**

Page 3.

- Stage 1: Adult mosquito
- Stage 2: Pupa
- Stage 3: Larva
- Stage 4: Egg Raft

Page 4.



**Mosquito Search**

HIDDEN WORDS

MOSQUITO  
VIRUS  
WESTNILE  
MALARIA  
HABITAT

LARVA  
PUPA  
EGGRAFT  
DRAGONFLY  
AFRICA

**Page 5.**

Screen  
Dawn to Dusk  
Dress  
DEET  
Drain

**Page 6.**

Tire filled with standing water  
Trash can  
Bird bath  
Plastic containers  
Plant containers  
Tree hole

**Page 7.**

Head  
Abdomen  
Adult  
Egg raft  
Thorax  
Larva  
Proboscis  
pupa

**Page 8.**

1. No
2. Yes
3. No
4. Yes
5. No
6. Yes
7. No
8. Yes
9. Yes
- 10.No

**Answer Key:** Third, Fourth, and Fifth Grades

**Mosquitos and You!**  
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**Page 3.**

- Stage 1: Adult mosquito
- Stage 2: Pupa
- Stage 3: Larva
- Stage 4: Egg Raft

**Page 4.**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Q	E	U	G	N	E	D	Y	Z	A	I	U	W	S	O	H	I
2	B	N	J	E	U	L	A	R	V	A	O	P	C	X	T	U	K
3	A	R	W	E	S	T	N	I	L	E	S	O	P	C	X	T	U
4	K	L	A	F	R	I	C	A	M	R	D	V	F	T	N	G	U
5	F	U	N	B	R	A	E	I	N	W	S	O	H	I	Q	Y	Z
6	A	I	B	A	L	L	M	G	A	A	D	P	E	O	E	N	I
7	L	M	A	P	P	O	D	E	G	I	L	J	E	U	A	R	S
8	M	R	D	V	F	U	T	N	G	R	E	Q	Y	Z	A	I	U
9	O	W	S	O	H	I	P	B	N	A	A	J	E	U	O	P	C
10	X	T	T	U	K	A	R	S	O	L	R	F	C	X	T	U	K
11	L	M	I	R	D	V	F	T	N	A	G	U	T	F	U	N	B
12	R	A	I	U	N	W	S	O	H	M	I	Q	Y	Z	A	I	B
13	I	L	M	A	Q	D	P	E	O	E	N	I	L	M	A	P	O
14	D	E	L	J	E	S	U	A	R	S	M	R	D	V	F	T	N
15	G	E	Q	Y	Z	A	O	I	U	W	S	O	H	I	B	N	J
16	E	U	O	P	C	X	T	M	U	K	A	R	S	O	P	C	X
17	T	U	K	L	M	R	D	V	F	T	N	G	U	F	U	N	B
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

**Mosquito Search**

HIDDEN WORDS

MALARIA  
EGGRAFT  
AFRICA  
PUPA

LARVA  
MOSQUITO  
WESTNILE  
DENGUE

**Page 5.**

Screen  
Dawn to Dusk  
Dress  
DEET  
Drain

**Page 6.**

Plant containers  
Garbage can  
Birdbath  
Swamp  
Wheelbarrow with water  
Tire  
Tree hole

**Page 7.**

Head  
Abdomen  
Adult  
Egg raft  
Thorax  
Proboscis  
Pupa

**Page 8.**

1. Antennae
2. Female
3. Protein source
4. Carbon dioxide
5. Not panic
6. Birds
7. Africa
8. Culex nigripalpus
9. Veterinarian
10. Heartworm