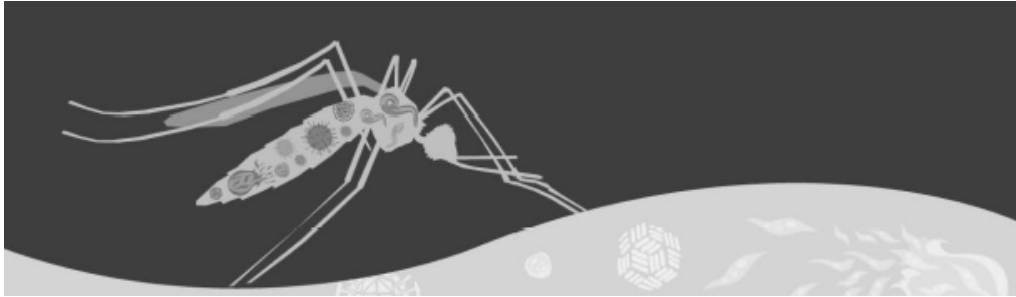


Infection Detection

A companion activity to
Beyond the Bite: GLOBE Mission Mosquito Disease Guide

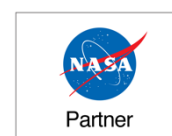


Four patients have just entered the emergency department at *Culicidae General Hospital.

Each patient exhibits different medical symptoms and has an interesting story to tell. A team of doctors trained in identifying mosquito-borne diseases springs into action. In addition to gathering and analyzing medical data, they must also uncover and factor in the relevant components of each patient's story. Their diagnosis is critical; mosquito-borne diseases are a leading cause of death around the world. Time is of the essence.

Culicidae* is the scientific family name of mosquitoes. It is pronounced: **kyū - lis - ə - dē

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Introduction

Infection Detection challenges players to solve medical mysteries involving mosquito-borne diseases. Working in small groups (three or four), one player assumes the role of the patient, the others work together as a team of doctors. The doctors must employ several strategies and use related resources to diagnose the patient's disease. This approach not only taps into the popularity and high degree of engagement associated with solving mysteries but also integrates several basic science practices: asking questions, interpreting data, constructing explanations, engaging in arguments from evidence, and evaluating information.

The activity supplements *Beyond the Bite: GLOBE Mission Mosquito Disease Guide*, a resource that provides key information on common mosquito-borne diseases. The doctors in the game will use *Beyond the Bite* to research and confirm their diagnoses.

This activity complements *Beyond the Bite* by

1. presenting science in a real-world context,
2. building a scientific understanding of mosquito-borne diseases,
3. revealing the potential consequences of human-mosquito interactions,
4. using role-playing to engage learners in a “real-life” scenario involving mosquito-borne diseases, and
5. appealing to those with a strong interest in biology, health sciences, and entomology.

Facilitator's Guide Contents

- Activity Specifics
- Roles in the Activity
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- Starting the Activity
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- Answer Key to Blood Lab Results and Final Diagnosis

Introductory Script

Reproducible Pages

Facilitator's Guide

Activity Specifics

Summary: Through a compelling role-playing activity, teams of learners will uncover medical symptoms and gather relevant personal history to diagnose a patient infected with a mystery mosquito-transmitted disease.

Where to play: The activity can be played in formal education settings (classrooms) or informal education settings (libraries, museums, afterschool programs, camps, and youth programs).

Age range: Designed for learners aged 11 and up.

Number of players: The activity is played in groups of three or four. Within each group, one learner plays the role of the patient; the remaining learners serve as the team of doctors.

Estimated time (per case study): The activity requires 40–60 minutes. Multiple case studies can be done simultaneously within that window.

Roles in the Activity

The activity consists of four roles:

1. The **Head Physician** on duty at Culicidae General Hospital (you, the facilitator) introduces the activity and verifies the doctors' final diagnosis.
2. The **Lab Director** at Culicidae General Hospital (you, the facilitator) provides the results from the blood test ordered by the team of doctors.
3. The **patient** arrives at Culicidae General Hospital due to the onset of symptoms of a mosquito-borne disease.
4. The **team of doctors** at Culicidae General Hospital will examine the patient and diagnose the disease. (The team consists of 2 to 3 doctors.)

Activity Materials

Beyond the Bite GLOBE Mission Mosquito Disease Guide. Prior to starting the activity, learners should familiarize themselves with *Beyond the Bite* (see instructions in the next section).

<https://strategies.org/products/beyond-the-bite>

Introductory Script. This script introduces the activity and, at the same time, immerses the learners in the scenario. As the Lead Doctor in the scenario, you will read this aloud to establish the roles, procedures, and objectives. Find this on pages 9-10.

Doctor's Instruction Sheet. This sheet lists the overall instructions for the team of doctors. Find this on pages 12-13.

Doctor's Notes: History and Physical (H & P). This form, found on pages 14-15, includes the four steps that each doctor must complete. These include:

Step 1: "History Chart Notes" to record recent events in the patient's life that may be important to the diagnosis.

Step 2: "Physical Chart Notes" to record the physical indicators of the disease.

Step 3: “Lab Work” to record the blood test results.

Step 4: “Follow-Up” to identify possible diseases in area(s) visited by the patient using *Beyond the Bite*.

Doctor’s Diagnosis Report. The doctors will use this form to record their final diagnosis. The form also requires a written list of indicators used to reach that diagnosis and the medical treatment that the doctors would advise. Every doctor on the team must authorize this final report by signing the form. The patient must release consent by also signing the form. One doctor will present the completed form to the Head Physician (you, the facilitator) for confirmation. Find this on page 16.

Patient Sheets. There are four patient sheets (numbered Case Study #1, #2, #3, and #4). Each is focused on a different disease. It is important to note that the name of the disease does not appear on the sheets; the sheets are identified only by number. Therefore, the patient will not know which disease they are presenting. Each sheet features a different story told from the perspective of a person who has acquired a mosquito-borne disease. Each story describes symptoms and gives insights into the patient’s recent activities (history) related to how they may have contracted the disease. There is space at the bottom of the page for patients to list their symptoms and activities; it will serve as their quick reference guide when the doctors ask them questions. Find these on pages 17-20.

Examination Room Table Tents. There is one copy of the foldable form on page 21. Print off one copy for each doctor/patient group. Add the group number to the form.

Patient ID Cards. Each patient should be given a card on which they will write their name and the date of their examination. There are four separate cards on the form on page 22.

Patient Waiting Room Activities. Toward the end of the activity, there will be a short period of time during which the doctors must finalize their diagnosis. During that time, the patient from each group will move to an area in the room you designate as the “Waiting Room.” Activities are on pages 23-41. There are three options for the patient:

1. Complete a printed word search or crossword puzzle.
2. Create a Mosquito Teller
(https://strategies.org/wp-content/uploads/2020/05/LowInk_MosquitoTeller.pdf).
3. Read the *Zika Zine* online (<https://scied.ucar.edu/zikazine>) and Draw Wanda.

Facilitator Preparation

1. Determine the total number of players based on class or program size.
2. Determine the number of patient/doctor groups based on the number of players.
3. Each group must consist of 3-4 players; 1 player in each group will be the patient; the remaining 2 or 3 will be doctors.

Print out the following: (Check the box to the left of each item as completed.)

- ☐ **Foldable table signs.** (One for each group exam room.) Find this on page 21.
- ☐ **Patient ID Cards.** (Four cards per page; each patient needs one card.) Find these on page 22.
- ☐ **Doctor’s Instruction Sheet.** (One for each doctor) Find this on pages 12-13.
- ☐ **Doctor’s Notes: History and Physical (H & P).** (One for each doctor) Find this on pages 14-15.
- ☐ **Doctor’s Diagnosis Report.** (One for each team of doctors). Find this on page 16.
- ☐ **Patient Sheets.** (One for each patient; divided between 1-4). Find these on pages 17-20.
- ☐ **Patient Waiting Room Activities.** Find these on pages 23-41.
- ☐ **Blood Test Results and Final Diagnosis** sheet for you to have handy when doctors approach you for this information. Find this on page 8.

NOTE: If you plan to have each group play more than one round (i.e., diagnose a different disease), you must print and compile new packets of worksheets for each round. For each new round, the patient should switch roles with one of the doctors. Make sure no group studies the same disease twice.

Designate an area to be the “Patient Waiting Room.” It should be separated from the Exam Room. The space should contain enough desk or table space to allow the patients to work on puzzles, tellers, and computers to read the *Zika Zine* online.

Have several copies of the crossword puzzles, word search puzzles, Mosquito Tellers, and Draw Wanda (along with scissors) nearby. Place several pencils in the area for patients to use.

Designate an area for the “Exam Rooms.” Have the foldable table signs designating each group’s examination room number ready to hand to each group.

- ☐ Assign player roles.
 - Randomly select those learners who will play the role of the patients. As they are selected, present them with a Patient Card. (The number will depend on the number of groups; if there are 8 groups, there must be 8 patients.)
 - Inform all other learners that they will play the roles of doctors.
- ☐ Have players move to appropriate areas.
 - Patients should move to the “Patient Waiting Room” area (one side of the room). Each patient should sit at a separate table or desk.
 - Doctors should move to the Doctor’s Examination Room” area (other side of the room). Once doctors are in their area, randomly break them into examination teams of 2 to 3 members (see above). Have them move into a group (either around a table or moving desks into a pod). Provide each team with one of the foldable table signs that will indicate their Exam Room Number. Have them display that sign on their table/desktop.
- ☐ Hand out the worksheets.
 - Each patient should receive a “Patient Sheet” containing their Case Study number and medical information. (Ensure that each of the four case studies gets randomly distributed among the patients.) Also, on that sheet, the patient will find the specific number for the team of doctors that they will work with.
 - Each doctor should receive a “Doctor’s Instruction” sheet and a “Doctor’s Notes: History and Physical (H & P)” sheet. Each team of doctors should receive one copy of the “Diagnosis Report.”
- ☐ Introduce all players to the computer resources that they will use. Use a smart display to:

- ☐ Open the ***Beyond the Bite*** guide <https://strategies.org/products/beyond-the-bite>. It will be a resource used by the doctors to reach their final diagnosis. Starting on page 4, display the following sections: Background, Introduction, and At a Glance Table.
Beyond the Bite is available in the following languages:
 - https://strategies.org/wp-content/uploads/2020/07/BeyondTheBite_ENGLISH-06-30-2020.pdf (English)
 - https://strategies.org/wp-content/uploads/2020/06/BeyondTheBite_SPANISH.pdf (Spanish)
 - https://strategies.org/wp-content/uploads/2020/06/BeyondTheBite_PORTUGUESE.pdf (Portuguese)
- ☐ Point out the following features of the guide: the “At a Glance” table on pages 12 and 13 and the format of the seven individual disease entries featured in ***Beyond the Bite*** (which include the cause, range, transmission, incidence, symptoms, treatment, general info, history, and risk area maps for each).
- ☐ The Zika Zine <https://scied.ucar.edu/zikazine> can be read while awaiting the doctor’s diagnosis.

Facilitator’s Role

As the facilitator, you will have two critical pieces of confidential information for each team: the blood test results and the final diagnosis. Both are included in tables on the last page of this Facilitator’s Guide. The information on those sheets should be treated as confidential medical information; you should not share it with the learners until a doctor from the group specifically asks for it during the activity. One doctor from each team will approach you at two different times during the activity: first for the blood test results, then at the end for the final diagnosis.

Playing the Activity

1. Read the “Introductory Script” on page 8 aloud to the entire group.
2. Provide time (as needed) for team members to prepare:
 - a. Patients must read their sheets and enter their notes at the bottom of the page.
 - b. Doctors must read each of their three sheets. Each doctor should choose three to five questions from the “Doctor’s Notes: History and Physical (H & P)” they wish to ask the patient.
3. Instruct the doctors to take turns asking the patient the four questions in Step 1: History Chart Notes. Each doctor should record patient answers.
4. The doctors should continue the exam by taking turns asking the patient their selected medical questions. Remind them that every doctor must record all answers.
5. After recording the answers, one doctor from each group must report to the Lab Director (you) to request the blood results. That doctor will return to the group and share the blood test results with their team. Each doctor must record those results.
6. At this point, the patient in each group should move to the “Patient Waiting Room” to allow the doctors time to work on the diagnosis. While in the waiting room, patients should work on the puzzles, Mosquito Tellers, and/ or read the *Zika Zine* online.
7. The doctors should work together to form a diagnosis. They must review and discuss their notes and research ***Beyond the Bite*** to reach a diagnosis. They should then record the name of that disease on the “Diagnosis Report” sheet.
8. Remind learners that each doctor and patient must sign the sheet.

9. Ask students to choose one doctor from their group to bring the “Doctor’s Diagnosis Report” sheet to the Head Physician (you) for verification. You will tell them if their diagnosis is correct or incorrect.
 - a. If the diagnosis is incorrect, the team of doctors must return to their seats and reevaluate their findings. The patient continues working on the Waiting Room Activities. When ready, the doctors should resubmit the updated diagnosis to the Head Physician (you).
 - b. If the diagnosis is correct, that team has finished that disease diagnosis and will wait until the Head Doctor reassigns case studies and teams for additional rounds. Any puzzles the patient worked on should be handed to the Lab Director.

*It is crucial that when the group successfully solves the mystery (diagnoses the disease), they do not share their findings with the other groups, and all papers from that round are turned in. If playing another round, the patient must switch roles with one of the doctors, and you must hand out new copies of the appropriate forms for a different case to each player.

Reviewing the Activity

When each patient diagnosis has been successfully completed (all rounds are done), gather for a follow-up conference session. In this session, encourage all participants to respond to the following questions. (Feel free to add any other questions.)

1. What did you find out about West Nile Virus? Yellow fever? Dengue? Malaria?
2. What were the similar environmental conditions under which each showed up?
3. Did any of the diseases have common symptoms? Which diseases? What were those symptoms?
4. What were common treatments for the diseases?
5. Does it change anything about the safety precautions you may take while outside?

Answer Key to Blood Lab Results and Final Diagnosis
Lab Director's Eyes Only

Case Study #1

Blood Lab Results	virus present
Final Diagnosis	West Nile virus

Case Study #2

Blood Lab Results	virus present
Final Diagnosis	yellow fever

Case Study #3

Blood Lab Results	virus present
Final Diagnosis	dengue

Case Study #4

Blood Lab Results	<i>Plasmodium</i> present
Final Diagnosis	malaria

Introductory Script

Important note:

Culicidae* is the scientific family name of mosquitoes. It is pronounced: **kyū - lis - ə - dē

Script to be read aloud.

Hello, everyone.

My name is Dr. [insert your last name]. I am the Head Physician at Culicidae General Hospital. I also serve as the Lab Director of Culicidae's blood lab. As you know, Culicidae General is a world-renowned hospital that specializes in diagnosing and treating mosquito-borne diseases.

This is directed to the patients:

We want to thank you for putting your trust in our hospital and our doctors. We are well aware of the fact that you chose to come to our hospital because there is a strong possibility that your illness is a result of a mosquito bite.

I have assembled a group of highly trained doctors to work on your case. They will gather facts and data by asking you questions. They will order and interpret lab tests. They will gather related details of your recent non-medical history, such as travel experiences and possible exposure to mosquitoes.

You have been given a "Patient Card," along with a sheet entitled "Patient Sheet." It contains confidential information; please do not share it with anyone other than your team of doctors. Please note on the top of the page to the right of your name is a "Case Number." You must provide that number to the doctors when asked. Below that, the hospital staff has summarized and compiled the background information you provided at check-in, along with the description of your medical symptoms and concerns. Please read it carefully and then make your notes in the two tables at the bottom of the page. You must do this quickly before interacting with the doctors. You will use your notes to answer the doctors' questions. Please note: if, during the examination, you cannot determine a specific answer, simply state, "I do not know." You cannot make up answers or provide false information to the doctors. Doing so could jeopardize your diagnosis and care.

This is directed to the doctors:

We appreciate your dedication to our patients. As always, the hospital has compiled our standard packet of medical documents for you to use. We ask that you please read the "Doctor's Instruction Sheet" before beginning the patient examination as the information is critical and we require that the steps must be performed in the order listed. Use the "Doctor's Notes: History and Physical (H & P)" to record your information and data. Computers are available for you to research the Beyond the Bite guide, allowing you to reach and confirm your diagnosis. When ready, record your findings and sign the "Doctor's Diagnosis Report." All sheets must be submitted to me at the completion of the examination for hospital records. Please see me if you have any questions.

To both patients and doctors:

Everyone – your attention to detail is expected.

When the examination is complete, the doctors will need time to reach an accurate diagnosis. While they work together to do that, we ask that each patient return to the side of the room designated as the "Patient Waiting

Area.” There you will find puzzles to play, a game to make and play and/or a book about mosquitoes to read online.

When the doctors’ have reached a diagnosis, they will enter that diagnosis and related information on their diagnosis sheet. Patients, you will be shown that sheet; doctors will present their diagnosis and share additional information about the mosquito-borne disease that you contracted. All of you will need to sign that sheet to confirm your participation in the examination. It must be returned to me, the Head Physician, for my confirmation and approval. When approved, remember to submit all paperwork to me for the hospital records. This includes the patient sheet, doctor’s sheets, and all Waiting Room worksheets. Thank you all very much.

Now, let’s get going! Time is of the essence; the patient’s health is in jeopardy.

Reproducible Pages

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Doctor's Instruction Sheet

Culicidae General Hospital

Comprehensive Diagnostic Examination

You are a doctor specializing in seven common diseases transmitted by mosquitoes: chikungunya, dengue, eastern equine encephalitis, malaria, West Nile virus, yellow fever, and Zika.

A patient has arrived at your hospital. You gather with your team of doctors to prepare for the exam.

You will ask questions of the patient, analyze blood lab results, and search ***Beyond the Bite*** for information that supports your diagnosis.

The process for each doctor.

1. Begin by asking the patient for their Case Study number (on the upper right corner of the "Patient Sheet.") Record that number on the "H & P Sheet" and "Diagnosis Sheet."
2. Read over the questions in both Steps 1 and 2 on the H & P page. (Note: while you are doing this, the patient is also reviewing their sheet.)
 - a. Your team must take turns asking your patient all the questions in Step 1 (Non-medical history).
 - b. Each doctor on the team must choose 3-5 questions from Step 2 (Medical questions) to ask the patient. Mark those.
3. When both the team of doctors and the patient are ready to begin the examination, the doctors will take turns asking the questions in Step 1.
4. In Step 2, each doctor will take turns asking the medical questions and will record the patient's answers.
5. Your team ordered a blood test to check for any pathogens. Results from that test will be available when you finish talking with your patient. One doctor from your team needs to request those results from the Lab Director (your teacher or leader). You must ask for the results using only the Case Study number for this patient. All doctors will record the blood test results under Step 3 of the H & P form.

When all the patient's information and blood test results are complete, ask the patient to move to the Patient Waiting Room.

6. Use ***Beyond the Bite*** to help determine the final diagnosis. Begin with the tables on pages 14- 15. After narrowing down the possibilities, go to the related entry in the guide. Then check each map in the ***Beyond the Bite*** to confirm that the mosquito-borne disease you suspect has been reported in the area your patient visited.

7. You will then confer with doctors on your team to reach a consensus on the final diagnosis. Your team will write that diagnosis and answer two related questions on the sheet entitled “Doctor’s Diagnosis Report.” Each doctor, as well as the patient, must sign the sheet.

One doctor from the team should then submit your diagnosis sheet to the Head physician at the hospital (your teacher or leader), along with any puzzles the patient completed.

8. If the diagnosis is incorrect, the team of doctors must return to their exam room and reevaluate their findings. The patient should stay in the Waiting Room and continue to work on activities there. When ready, the doctors should resubmit their updated diagnosis.

If the diagnosis is correct, the team has finished that round and will wait until the Head Physician ends the game or reassigns case studies for additional rounds.

Step 1: History Chart Notes

Doctors take turns asking the patient ALL the questions below.

Non-medical history questions to ask the patient:	Patient's response
Have you traveled outside the local area recently? If yes, where did you go?	
What did you do while you were there? (Can list several activities).	
Did you notice anything unusual in that environment/area during your visit?	
Have you gotten any mosquito bites lately?	

Step 2: Physical Chart Notes

Each Doctor should select three to five top questions to ask the patient. If your question is asked before it is your turn, select another.

Medical questions to ask the patient:	Answer (Yes /No)	Additional information
A. Have you had a fever? If yes, what was the highest reading?		
B. Have you noticed any rashes on your skin? If yes, where? Do they itch?		
C. Do you feel unusually tired?		
D. Have you noticed any change in the color of the whites of your eyes? If yes, do they appear either yellow or red?		
E. Have you had the chills?		
F. Have you had any headaches? If yes, were they mild or severe?		
G. Have any of your joints been bothering you? If yes, where? (neck, shoulders, hips, knees)		
H. Have you noticed any swelling in your joints? If yes, where?		
I. If you have joint pain, does that pain make it difficult to stand up straight?		
J. Have you experienced aches or pains in any of these other areas of your body: bones, muscles, back, eyes? If yes, which ones?		
K. Is there pain throughout your body?		
L. Have you experienced unusual weakness?		
M. Have you vomited?		
N. Have you experienced nausea? (stomach is uneasy or upset; but no vomiting)		
O. Have you had any episodes of diarrhea?		
P. Have you experienced any seizures? (sudden or uncontrolled body movements)		

Step 3: Lab Work

You ordered a blood test to check for the presence of any pathogens. Results from that test are now available from the Lab Director (your teacher or leader). You must ask for those using only the Case Study Number for this patient.

Record the results for any blood pathogens here: _____

Step 4: Follow-Up

Your patient shared that they had recently traveled outside their home area.

1. Where did the patient travel to? _____
2. Check the maps in ***Beyond the Bite*** for mosquito-borne disease risks in that area. You find that this area has a high incidence of the following disease(s):

Doctor's Diagnosis Report

Case Study # _____

Based on your patient-reported information, the test data you charted, and your research in the ***Beyond the Bite GLOBE Mission Mosquito Disease Guide***, what is your diagnosis for the Mystery Disease in this Case Study?

What were the three strongest indicators that led you to this diagnosis?

1. _____
2. _____
3. _____

What is the recommended medical treatment for this disease?

The following patient

(Printed Name of Patient)

(Signature of Patient)

has been evaluated at Culicidae General Hospital on _____
by the following doctors: (Date)

(Printed Names of Doctors)

(Signatures of Doctors)

***** Ask your patient to return to the exam room *****

***** As a team, share your diagnosis, indicators, and recommended treatment with the patient. *****

***** You must submit this report, along with all worksheets, to the
Head Physician for confirmation. *****

Background

You recently traveled to the state of Colorado to visit some of the natural attractions there. Since you intended to spend most of your time outdoors, you took your tent, hiking gear, and insect repellent. Your favorite part of the trip was camping and hiking in Rocky Mountain National Park. Each trail was challenging but beautiful. Two things that caught your attention while on several hikes were the number of dead trees in the area and the sporadic appearance of dead birds just off the trails. You thought both might be related to either drought or local disease. You also had to deal with many mosquitoes; even using the repellent did not prevent you from getting a few mosquito bites.

Medical symptoms and concerns

Since returning home ten days ago, you have not felt well. At first, you were feeling exhausted throughout the day. But since you had just been traveling and doing lots of hiking, you were not too concerned. But soon after, you developed an itchy rash on your arms and legs, which now seems to be spreading. What started as a low-grade fever reached a high of 103°F / 39°C within the last 24 hours. Now your symptoms have become more serious. You are having extreme headaches. Your neck has become stiff, and it is painful to move your head. You have vomited a few times and have also had bouts of diarrhea. It is time to see a doctor.

Preparing for the doctor's exam

To prepare for the exam and save time at the hospital, you must complete the following two tables.

1. A list of your symptoms

2. Additional information that may be important in determining your illness

Your recent activities:	Why that may be important:

Background

Your best friend from college moved to Brazil and invited you to visit. You arranged to arrive in mid-January and leave after the first week in February. It would be summer in Brazil during that time; days would be hot, but the common evening rainstorms would be a welcome relief. To prepare for your trip, you read articles online. One piece explained how the combination of warm weather and rainfall during that time caused an increase in the number of mosquitoes in the area. Luckily, you and your friend decided to spend most days at the beach, where mosquitoes were not a problem. Then you decided also to do a few tourist activities, including taking a walking tour of several historic areas, eating at restaurants with outdoor seating, and visiting other outdoor tourist attractions, including a day hike in the nearby mountains. The article was correct: mosquitoes were in areas away from the beach. You got a few bites, but it was worth it!

Medical symptoms and concerns

You had only been home about a week when you began to experience symptoms that you usually associate with a cold or the flu. You had a slight fever (which was sometimes accompanied by sweating), and you had occasional chills. You decided to follow the treatment protocols for colds/flu: plenty of rest, lots of fluids, and some over-the-counter medications. But after a few more days, your symptoms spread to muscle aches, back pain, and headaches. Two days after that, you began to experience abdominal pain, nausea, and vomiting, so you decided to see a doctor. While showering to get ready for your appointment, you noticed your skin had a slight yellow tint.

Preparing for the doctor's exam

To prepare for the exam and save time at the hospital, you must complete the following two tables.

1. A list of your symptoms

2. Additional information that may be important in determining your illness

Your recent activities	Why that activity may be important

Background

Your favorite aunt lives in Manila, Philippines. As a graduation gift, she sent you an airline ticket to come and visit her. Since you had never been to the Philippines, you called your aunt to ask several questions. Besides discussing the many things to do and see there, your aunt also told you to come prepared for warm temperatures (the upper 80s), rain (rainy season), and mosquitoes. But you decided that neither the heat nor the rain nor mosquitoes would stop you from visiting your aunt and touring the country. So, you arrived in Manila within two weeks of your mid-June graduation. Most of your two-week visit was spent outdoors touring several of the islands. You and your aunt spent lots of time outdoors, walking around the Mayon Volcano, the mounds of the Chocolate Hills, and the giant steps of the Banaue Rice Terraces. It rained most days, so there was lots of standing water, and the mosquitoes were relentless; you wouldn't trade the experience for anything.

Medical symptoms and concerns

The day after you arrived home, your aunt called to tell you that several family members you had spent time with were sick. You told her you would watch for any changes in your health. Sure enough, you developed a fever within 24 hours of her call. It continued to worsen, reaching 102°F / 38°C the next day. Soon, you got chills, a headache, and eye pain. Even though you could stand up straight with little to no pain in your joints, you decided to confine yourself to the couch to take it easy and try to recover. You then began to feel nauseated and even vomited a few times. A skin rash appeared. You decided to seek help.

Preparing for your doctor's exam

To prepare for the exam and save time at the hospital, you must complete the following two tables.

1. A list of your symptoms

2. Additional information that may be important in determining your illness

Your recent activities	Why that activity may be important

Background

You had always dreamed of going on an African safari. While checking online a few months ago, you found a package deal for an eight-day Kalahari Desert safari in Botswana. The package included pick-up and drop-off at the airport in Maun, Botswana's tourism capital. The eight-day safari included all transportation, food, and camping supplies (tents, stoves, etc.). You decided to cross it off your bucket list and GO! One thing that caught your eye was that the package deal was only available during January, February, and March—the summer months in Botswana. You also ran across an article that warned of the highly active *Anopheles* mosquito population during that time. But you would not let a few mosquitoes stop you from taking this dream vacation!

Medical symptoms and concerns

For six straight days after returning home, you were exhausted. It was all you could do to stay awake at work during the day and stay up long enough to watch your Netflix series in the evening. But you were not overly concerned; after all, you had just been on an exciting adventure, followed by an 11-hour flight to get home. But on Day 7, you began to experience both a fever and chills. You stayed home to rest. But then you woke up three days ago with a headache that soon turned into body aches and muscle pains.

To make matters worse, you began to experience nausea. Then, just this morning, you had a mild seizure. You did not lose consciousness but had almost one minute of uncontrolled jerking movements of your arms and legs. That was the symptom that forced you to get to the hospital. Something was definitely wrong.

Preparing for your doctor's exam

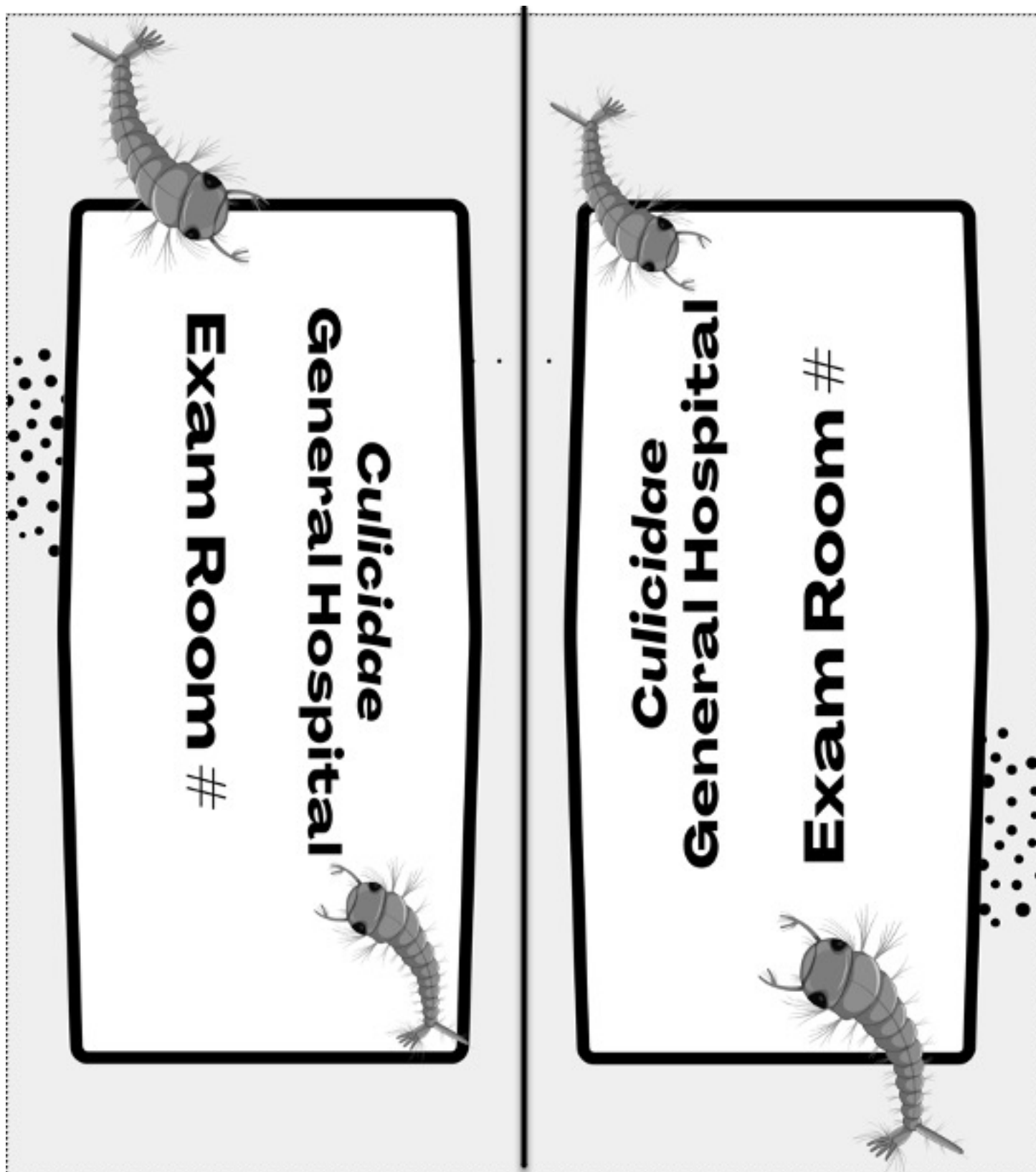
To prepare for the exam and save time at the hospital, you must complete the following two tables.

1. A list of your symptoms

2. Additional information that may be important in determining your illness

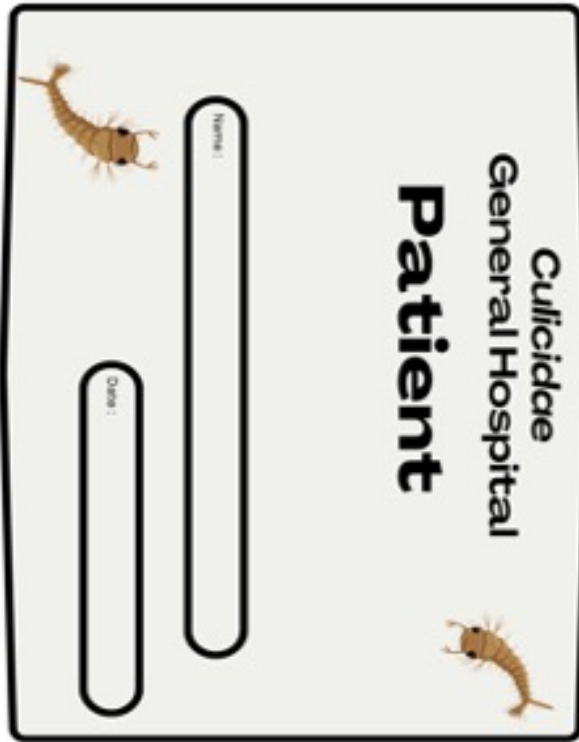
Your recent activities	Why that activity may be important

Exam Room Table Tents



Fold in half and place one in each Exam Room.

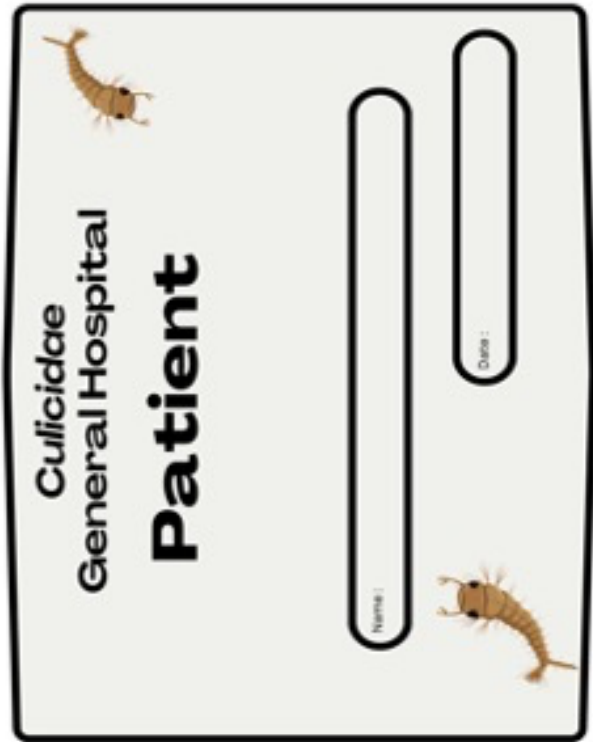
Patient ID Cards



Culicidae
General Hospital
Patient

Name :

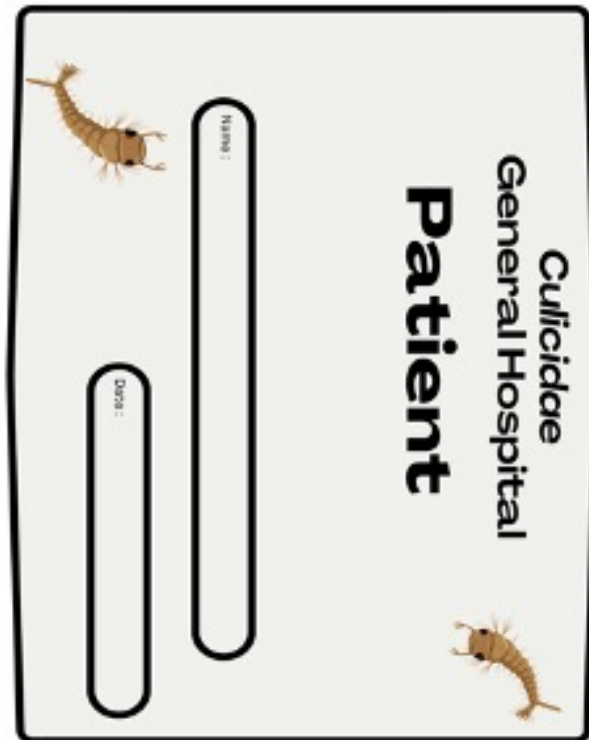
Date :



Culicidae
General Hospital
Patient

Name :

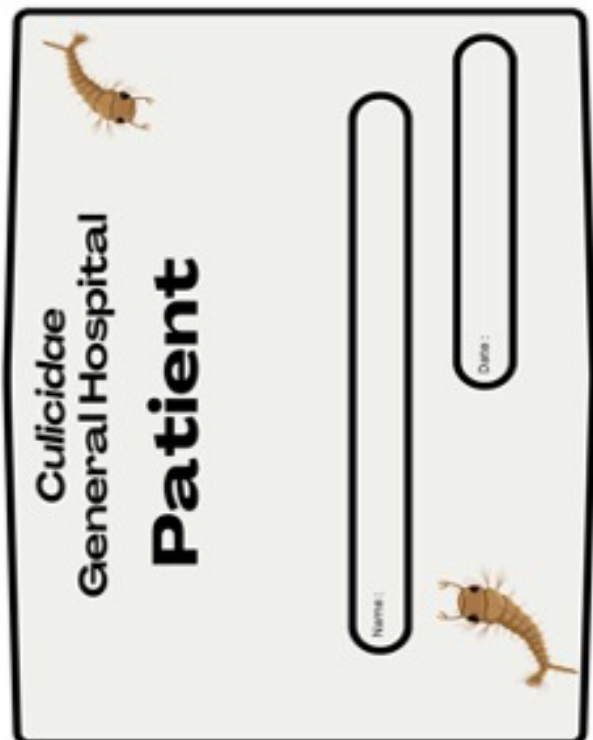
Date :



Culicidae
General Hospital
Patient

Name :

Date :



Culicidae
General Hospital
Patient

Name :

Date :



Print as needed.

Waiting Room Activities

Wordsearch Puzzles	24
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Zika Zine	41

Infection Detection Waiting Room Word Search #1

P	P	L	A	S	M	O	D	I	U	M	U	T	A
S	B	T	T	P	A	T	H	O	G	E	N	P	P
S	H	E	P	O	H	O	G	M	C	O	A	V	A
D	O	O	L	B	I	O	O	A	D	T	A	U	T
M	O	B	P	D	T	S	S	I	I	V	O	E	I
P	I	I	O	C	Q	E	M	P	D	E	S	R	E
P	O	T	M	U	L	N	O	E	I	C	E	E	N
A	T	E	I	C	U	I	T	V	A	T	S	P	T
R	I	T	P	S	M	C	P	I	G	O	A	E	D
A	O	R	M	D	S	C	M	R	N	R	E	L	E
S	S	P	A	A	O	A	Y	U	O	S	S	L	N
I	T	O	B	L	A	V	S	S	S	U	I	E	G
T	L	A	E	G	A	L	M	E	I	S	D	N	U
E	E	S	S	T	E	M	N	S	S	E	L	T	E

BITE
 BLOOD
 DENGUE
 DIAGNOSIS
 DISEASE
 DOCTOR
 HOSPITAL
 MALARIA
 MOSQUITO
 PARASITE
 PATHOGEN
 PATIENT
 PLASMODIUM
 REPELLENT
 SYMPTOMS
 VACCINE
 VECTOR
 VIRUSES

Words may appear straight across, backward, up and down, down and up, and diagonally.

Infection Detection Waiting Room Word Search #2

T	N	E	I	T	A	P	B	L	O	O	D	T	V
P	C	D	A	M	S	L	M	A	L	A	R	I	A
P	S	L	I	E	A	D	O	C	T	O	R	I	C
L	H	N	A	A	I	O	V	I	L	A	P	C	C
A	R	A	S	P	G	A	A	I	T	I	A	M	I
S	E	V	S	A	H	N	A	B	R	C	R	E	N
M	P	E	M	T	L	O	O	A	S	U	A	R	E
O	E	B	O	H	S	T	S	S	I	U	S	T	P
D	L	I	T	O	P	I	T	P	I	C	I	E	Y
I	L	T	P	G	A	U	H	T	I	S	T	A	S
U	E	E	M	E	S	Q	I	R	A	T	E	Y	C
M	N	L	Y	N	D	S	D	I	S	E	A	S	E
L	T	E	S	C	T	O	I	T	L	A	I	L	A
V	E	C	T	O	R	M	D	S	A	A	Y	O	C

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Infection Detection Waiting Room Word Search #3

D	I	E	A	P	O	D	O	C	T	O	R	C	E
A	E	V	A	C	C	I	N	E	E	P	I	Q	E
O	E	T	I	S	A	R	A	P	V	D	S	I	A
S	P	B	I	L	L	M	N	I	A	I	Y	B	P
I	T	A	R	N	S	R	R	B	L	S	M	O	L
S	S	R	T	A	E	U	T	B	I	E	P	A	A
O	E	E	O	I	S	G	B	A	T	A	T	I	S
N	T	P	L	E	E	V	O	L	E	S	O	R	M
G	I	E	S	P	V	N	L	H	O	E	M	A	O
A	B	L	O	N	E	T	T	B	T	O	S	L	D
I	B	L	N	C	C	I	S	U	R	A	D	A	I
D	I	E	E	T	T	O	V	A	A	I	P	M	U
V	E	N	N	M	O	S	Q	U	I	T	O	S	M
O	T	T	M	N	R	H	O	S	P	I	T	A	L

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Words may appear straight across, backward, up and down, down and up, and diagonally.

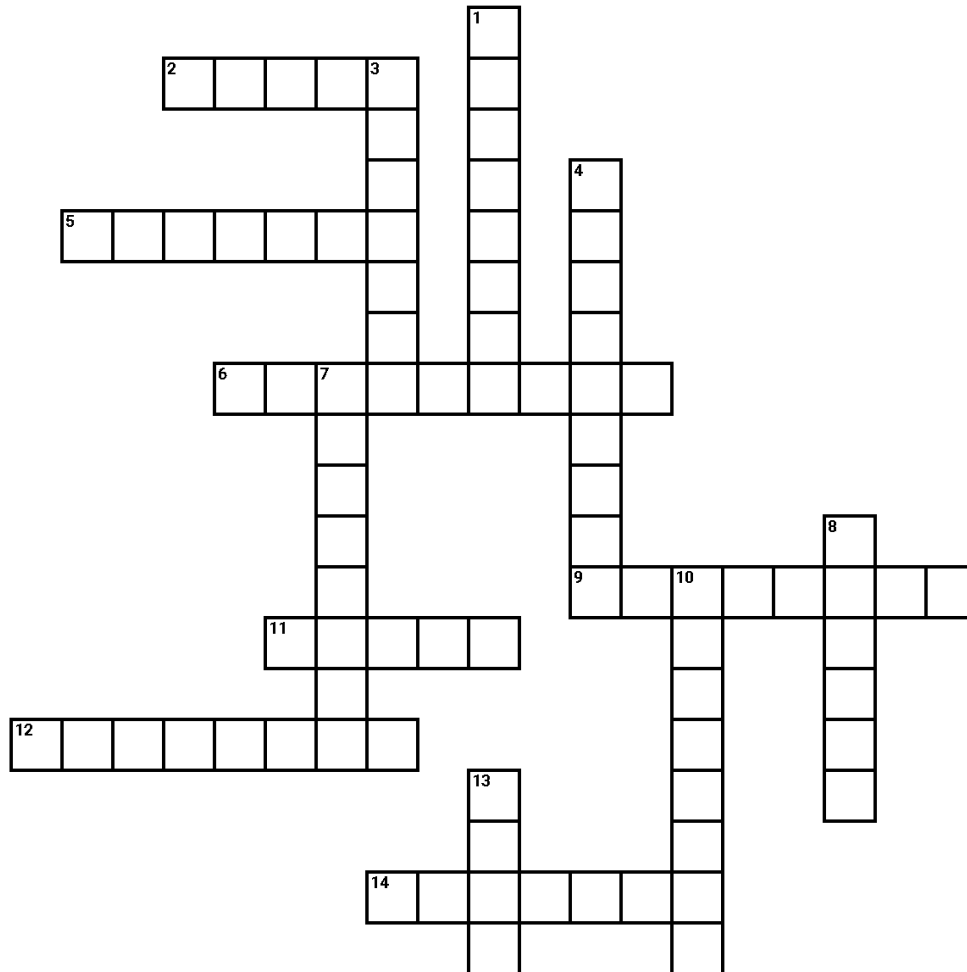
Infection Detection Waiting Room Word Search #4

E	C	L	P	L	A	S	M	O	D	I	U	M	U
B	O	A	A	E	O	L	G	E	E	P	B	E	D
E	T	T	T	S	T	N	O	S	G	I	C	E	O
L	I	I	H	I	S	I	V	S	T	T	E	P	C
A	U	P	O	S	E	E	C	E	N	U	E	V	T
I	Q	S	G	O	S	Y	M	P	T	O	M	S	O
S	S	O	E	N	V	E	S	A	E	S	I	D	R
E	O	H	N	G	P	A	R	A	S	I	T	E	V
S	M	N	P	A	T	I	E	N	T	B	E	E	A
U	L	I	O	I	S	V	A	O	U	L	C	R	C
R	R	C	T	D	E	G	D	I	D	O	O	D	C
I	R	E	P	E	L	L	E	N	T	O	T	I	I
V	M	A	L	A	R	I	A	B	I	D	D	I	N
R	V	E	C	T	O	R	C	C	M	E	I	O	E

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Words may appear straight across, backward, up and down, down and up, and diagonally.

Infection Detection Waiting Room Crossword #1



Across

[2] The liquid in the human body that the female mosquito sucks out.

[5] An injection used to prevent an infection or disease.

[6] A substance that drives away or wards off a mosquito.

[9] The signs of a disease that are used to determine a diagnosis.

[11] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human, causing disease or illness in the human.

[12] A general term for any agent (like a bacteria or virus) that causes a disease.

[14] a person receiving medical care or treatment.

Down

[1] A facility that provides medical and surgical care.

[3] A condition causing signs and symptoms of illness.

[4] The act of identifying a disease.

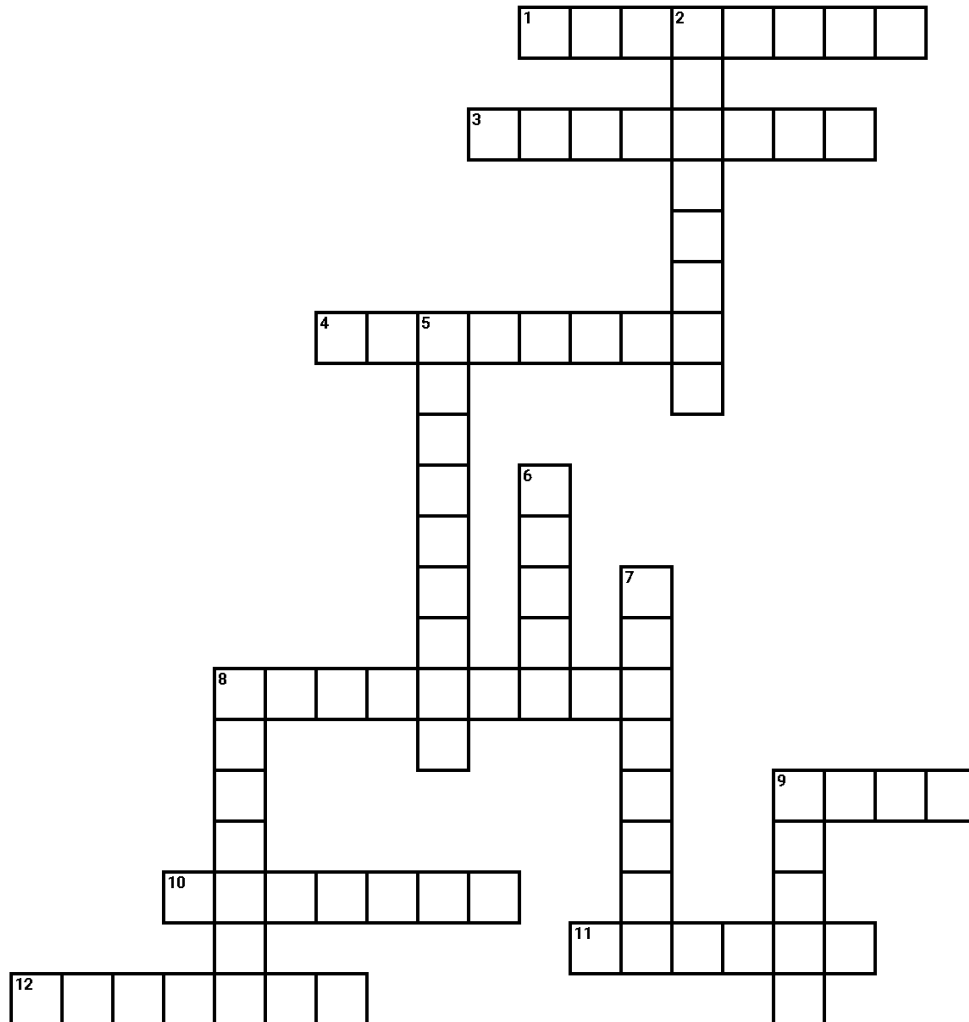
[7] A general term for an organism (like a bacteria or virus) that lives in or on a host organism and causes harm to that host.

[8] A person trained and licensed to practice medicine.

[10] A very common insect; the females bite to obtain blood.

[13] The act of piercing the skin with a "mouth part" (teeth, needles, fangs).

Infection Detection Waiting Room Crossword #2



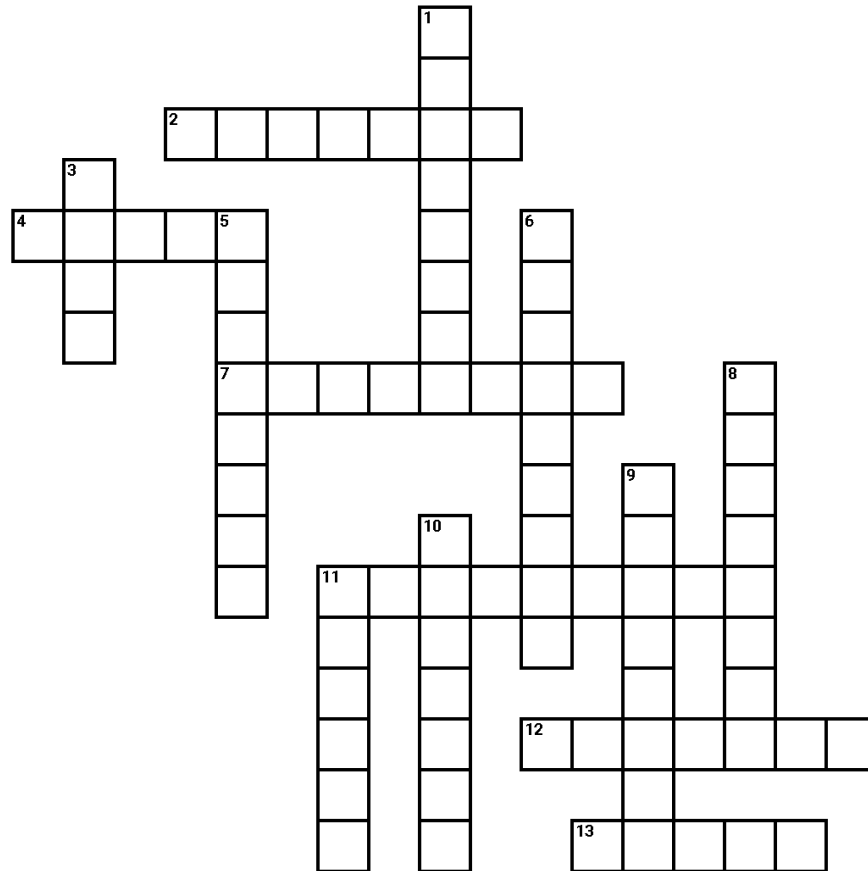
Across

- [1] A facility that provides medical and surgical care.
 [3] The signs of a disease that are used to determine a diagnosis.
 [4] A general term for an organism (like a bacteria or virus) that lives in or on a host organism and causes harm to that host.
 [8] The act of identifying a disease.
 [9] The act of piercing the skin with a "mouth part" (teeth, needles, fangs).
 [10] An injection used to prevent an infection or disease.
 [11] A person trained and licensed to practice medicine.
 [12] a person receiving medical care or treatment.

Down

- [2] A general term for any agent (like a bacteria or virus) that causes a disease.
 [5] A substance that drives away or wards off a mosquito.
 [6] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human, causing disease or illness in the human.
 [7] A very common insect; the females bite to obtain blood.
 [8] A condition causing signs and symptoms of illness.
 [9] The liquid in the human body that the female mosquito sucks out.

Infection Detection Waiting Room Crossword #3



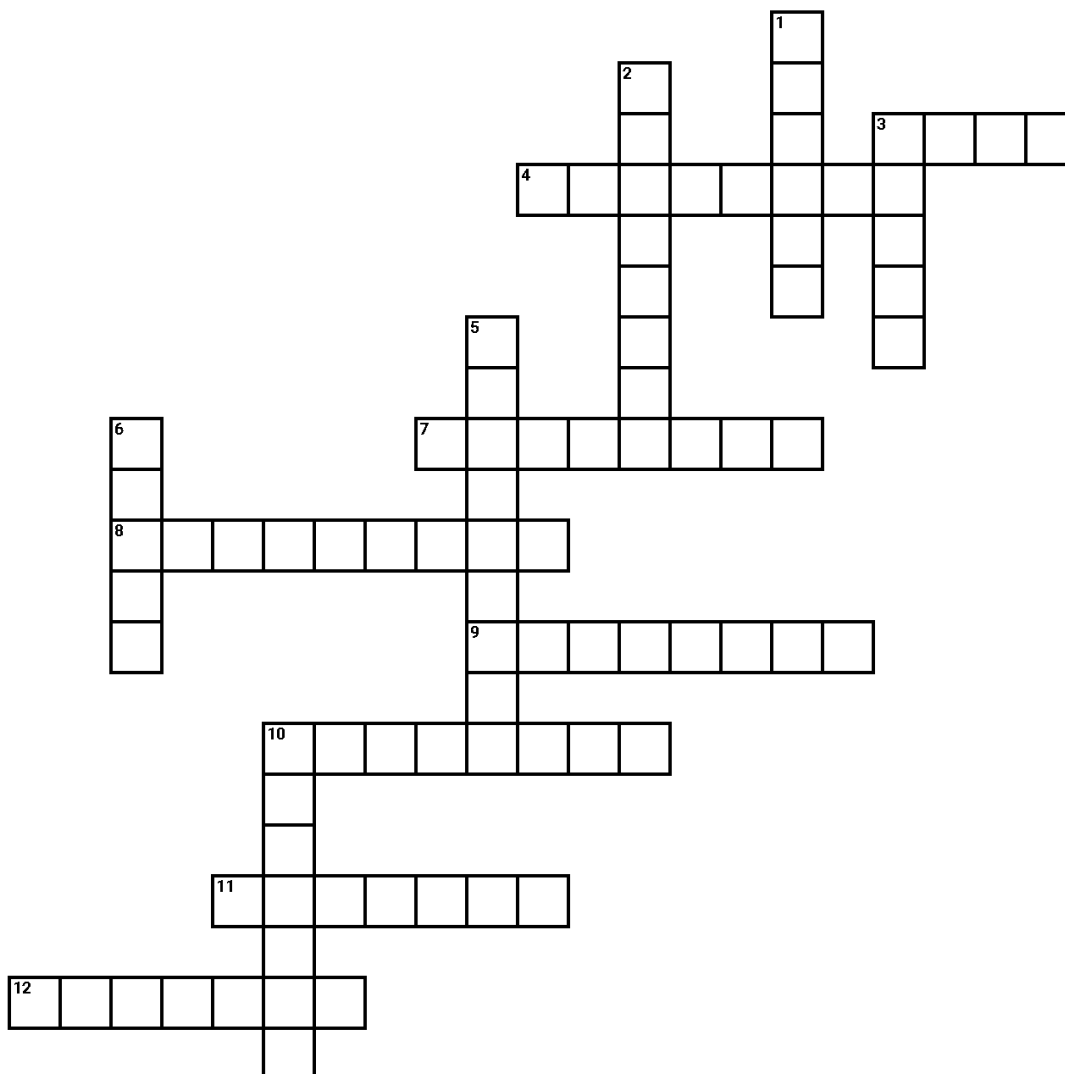
Across

- [2]** A condition causing signs and symptoms of illness.
[4] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human, causing disease or illness in the human.
[7] A general term for any agent (like a bacteria or virus) that causes a disease.
[11] The act of identifying a disease.
[12] a person receiving medical care or treatment.
[13] The liquid in the human body that the female mosquito sucks out.

Down

- [1]** A very common insect; the females bite to obtain blood.
[3] The act of piercing the skin with a "mouth part" (teeth, needles, fangs).
[5] The signs of a disease that are used to determine a diagnosis.
[6] A substance that drives away or wards off a mosquito.
[8] A general term for an organism (like a bacteria or virus) that lives in or on a host organism and causes harm to that host.
[9] A facility that provides medical and surgical care.
[10] An injection used to prevent an infection or disease.
[11] A person trained and licensed to practice medicine.

Infection Detection Waiting Room Crossword #4



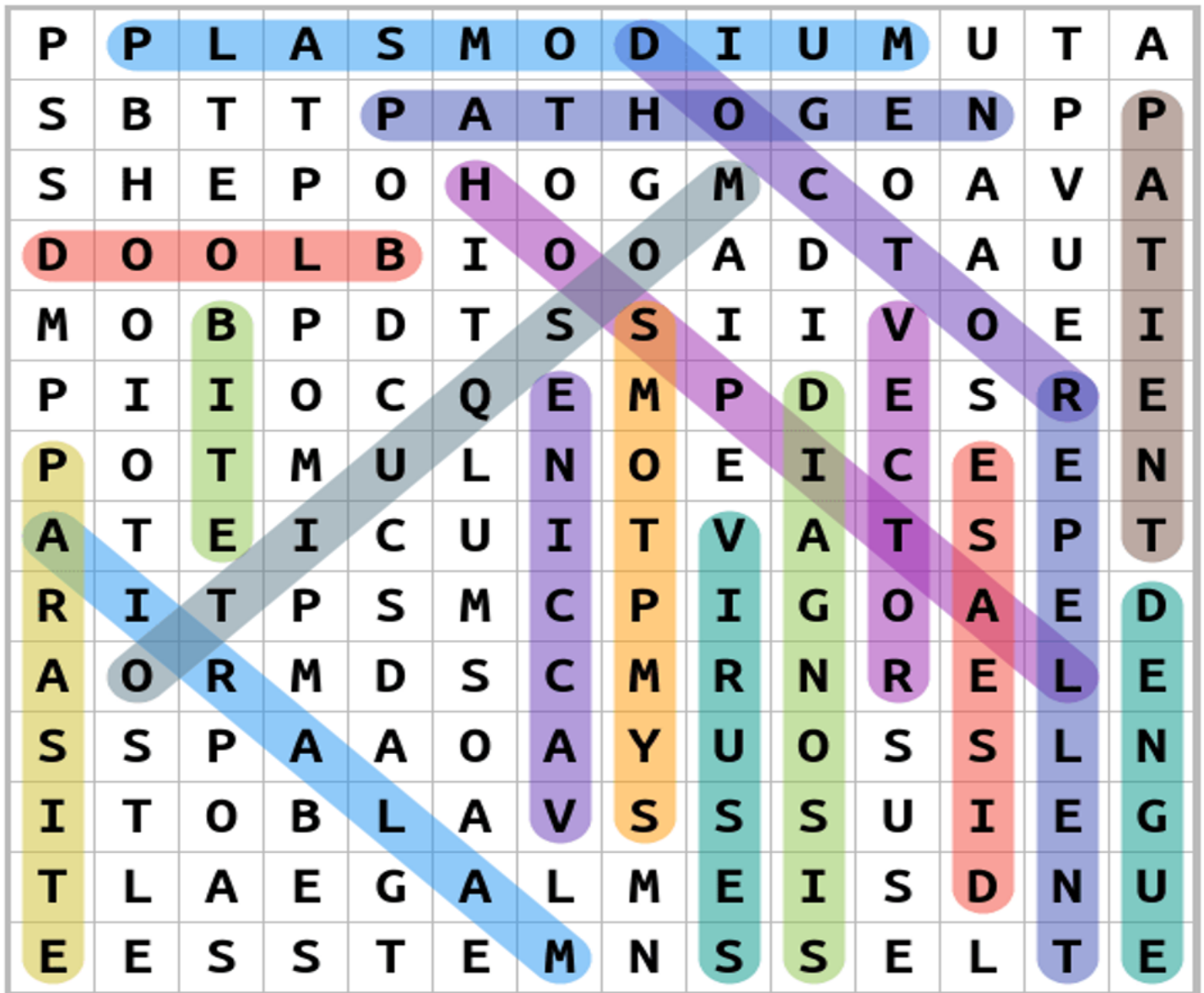
Across

- [3] The act of piercing the skin with a "mouth part" (teeth, needles, fangs).
 [4] A facility that provides medical and surgical care.
 [7] A general term for any agent (like a bacteria or virus) that causes a disease.
 [8] A substance that drives away or wards off a mosquito.
 [9] The signs of a disease that are used to determine a diagnosis.
 [10] A general term for an organism (like a bacteria or virus) that lives in or on a host organism and causes harm to that host.
 [11] A condition causing signs and symptoms of illness.
 [12] An injection used to prevent an infection or disease.

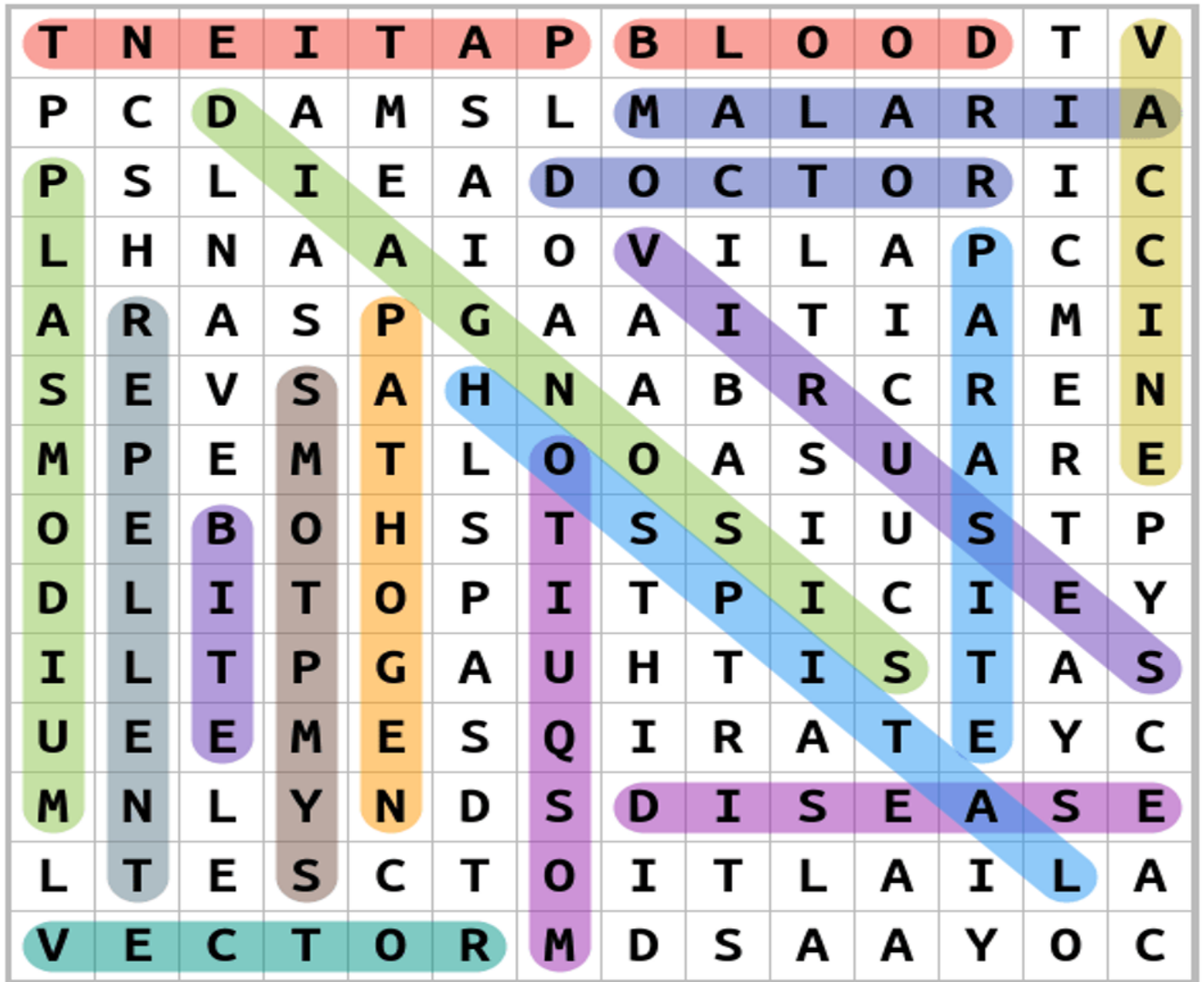
Down

- [1] A person trained and licensed to practice medicine.
 [2] A very common insect; the females bite to obtain blood.
 [3] The liquid in the human body that the female mosquito sucks out.
 [5] The act of identifying a disease.
 [6] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human, causing disease or illness in the human.
 [10] a person receiving medical care or treatment.

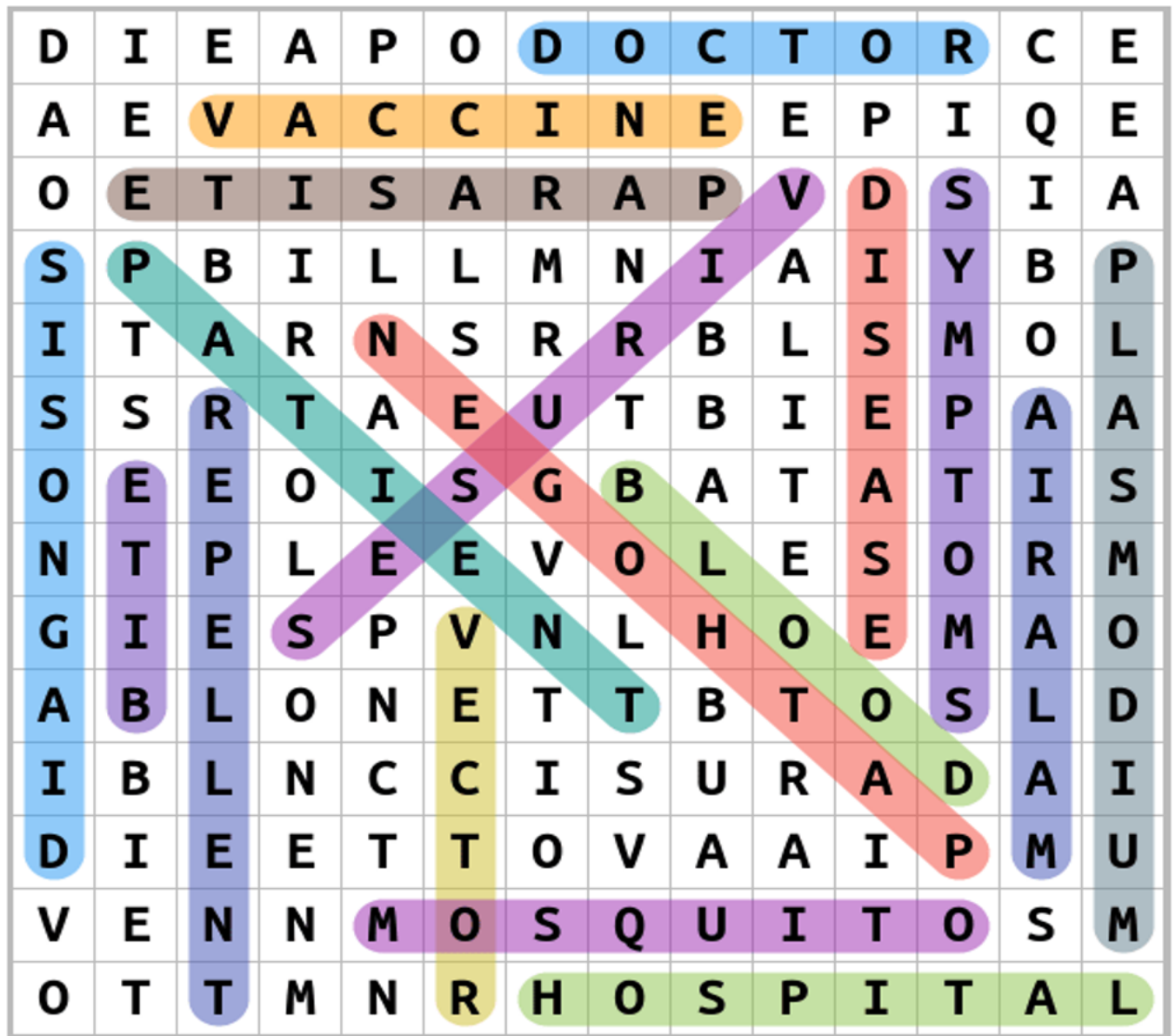
Infection Detection Waiting Room Word Search #1 Answers



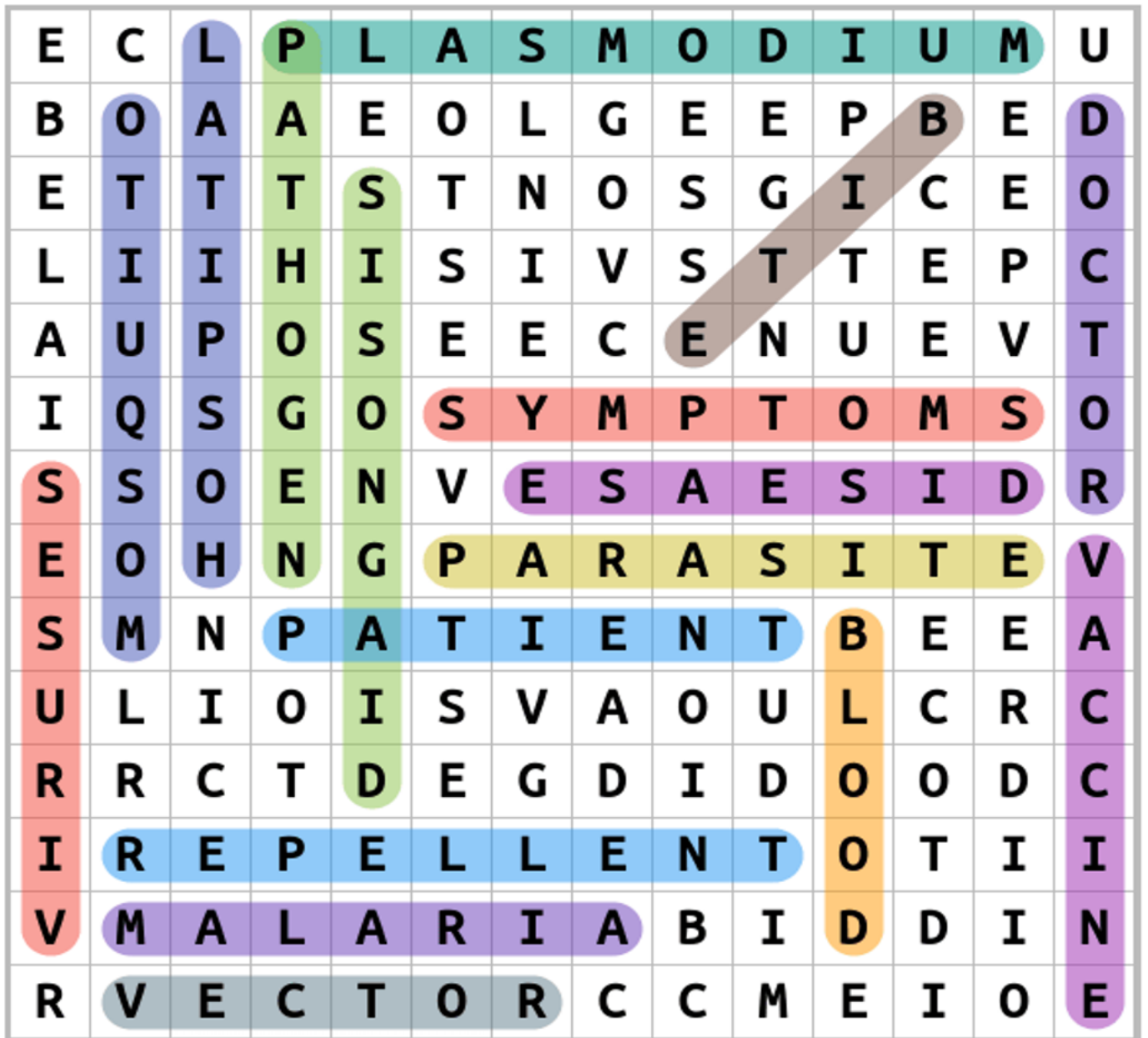
Infection Detection Waiting Room Word Search #2 Answers



Infection Detection Waiting Room Word Search #3 Answers

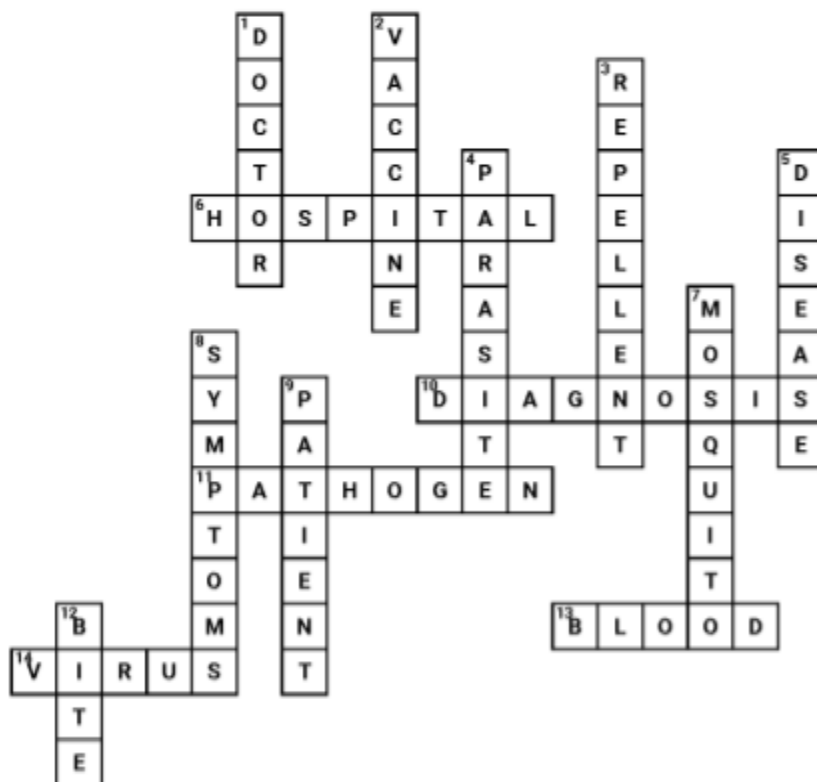


Infection Detection Waiting Room Word Search #4 Answers



Answers

Infection Detection Waiting Room Crossword #1



Across

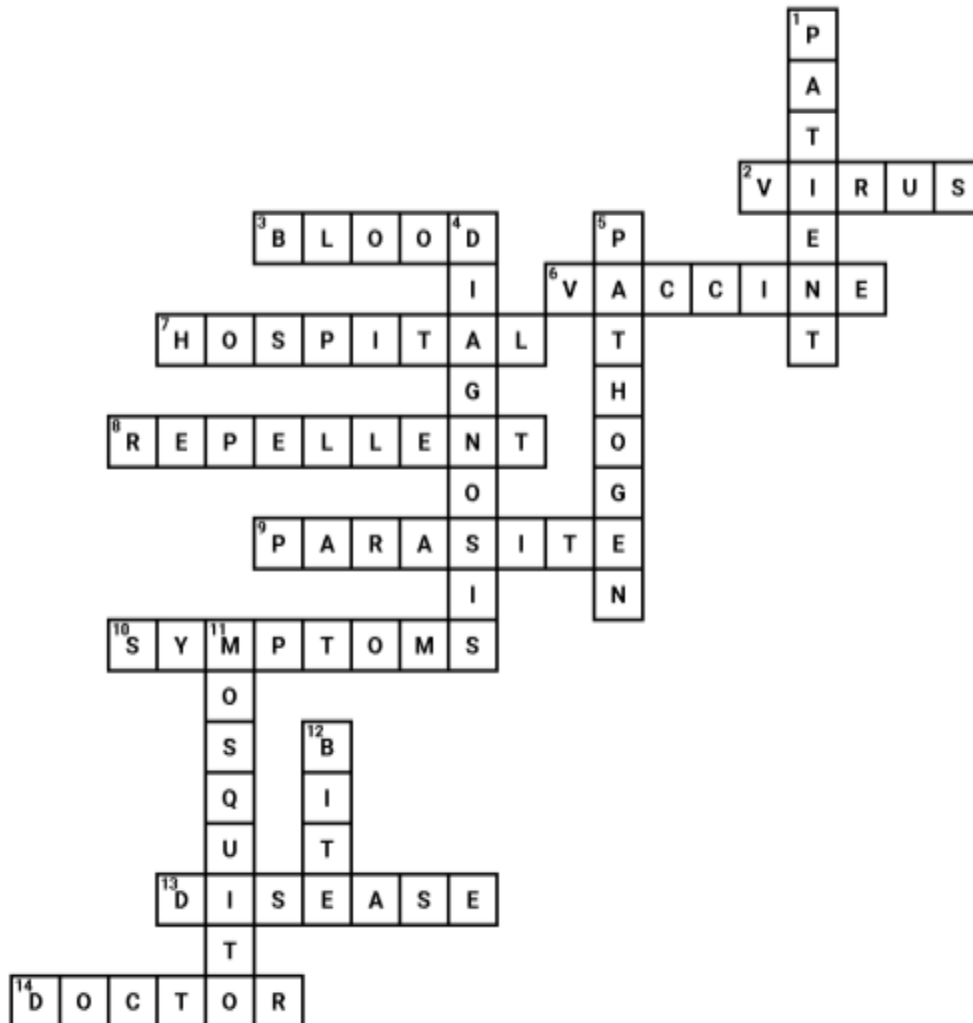
- [6] A facility that provides medical and surgical care.
 [10] The act of identifying a disease.
 [11] A general term for any agent (like a bacteria or virus) that causes a disease.
 [13] The liquid in the human body that the female mosquito sucks out.
 [14] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human:causing disease or illness in the human.

Down

- [1] A person trained and licensed to practice medicine.
 [2] An injection used to prevent an infection or disease.
 [3] A substance that drives away or wards off a mosquito.
 [4] A general term for an organism (like a bacteria or virus) that lives in or on a host organism:and causes harm to that host.
 [5] Condition causing signs and symptoms of illness.
 [7] A very common kind of insect; the females bite to obtain blood.
 [8] The signs of a disease used to determine a diagnosis.
 [9] A person receiving medical care or treatment.
 [12] The act of piercing the skin with a "mouth part" (teeth:needles:fangs)

Answers

Infection Detection Waiting Room Crossword #2



Across

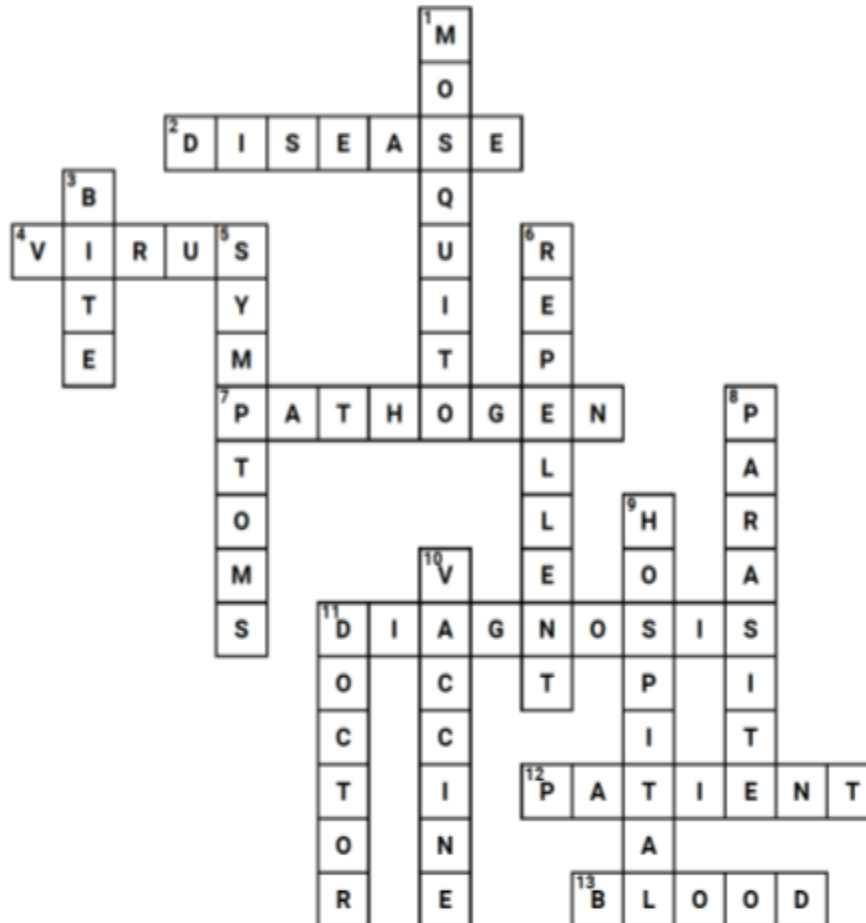
- [2] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human; causing disease or illness in the human.
 [3] The liquid in the human body that the female mosquito sucks out.
 [6] An injection used to prevent an infection or disease.
 [7] A facility that provides medical and surgical care.
 [8] A substance that drives away or wards off a mosquito.
 [9] A general term for an organism (like a bacteria or virus) that lives in or on a host organism; and causes harm to that host.
 [10] The signs of a disease used to determine a diagnosis.
 [13] Condition causing signs and symptoms of illness.
 [14] A person trained and licensed to practice medicine.

Down

- [1] A person receiving medical care or treatment.
 [4] The act of identifying a disease.
 [5] A general term for any agent (like a bacteria or virus) that causes a disease.
 [11] A very common kind of insect; the females bite to obtain blood.
 [12] The act of piercing the skin with a "mouth part" (teeth; needles; fangs)

Answers

Infection Detection Waiting Room Crossword #3



Across

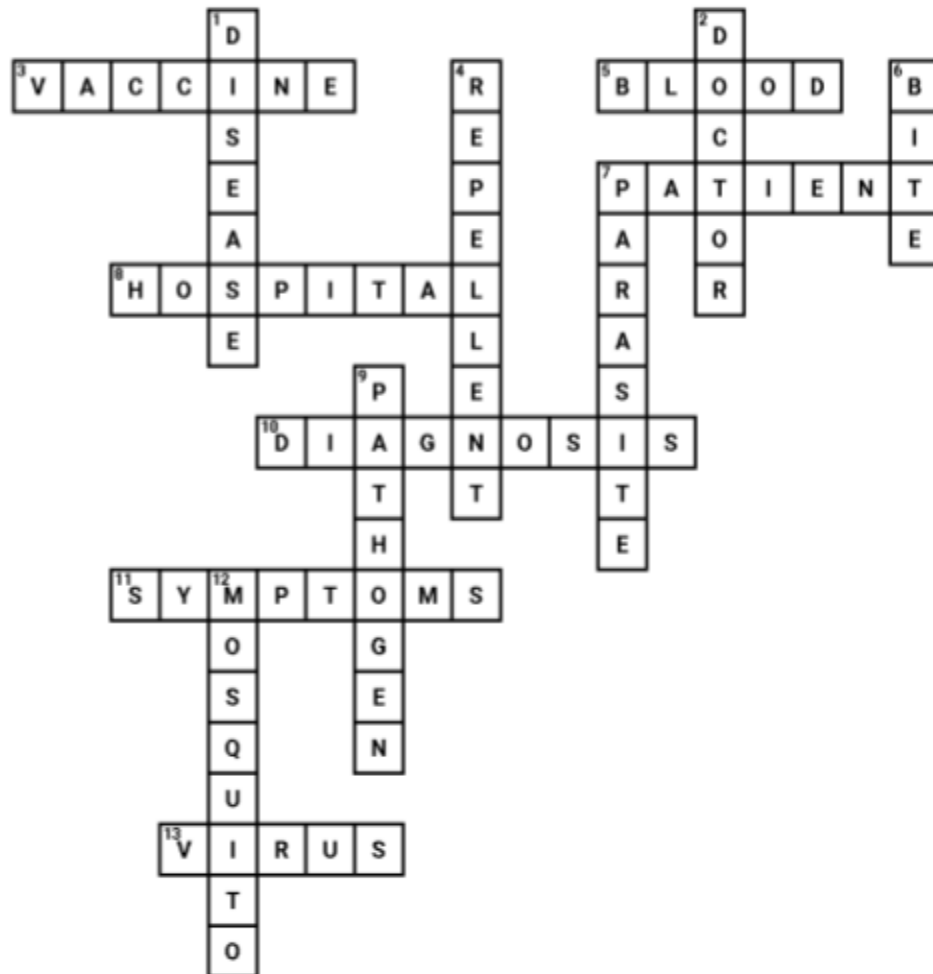
- [2] A condition causing signs and symptoms of illness.
 [4] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human, causing disease or illness in the human.
 [7] A general term for any agent (like a bacteria or virus) that causes a disease.
 [11] The act of identifying a disease.
 [12] a person receiving medical care or treatment.
 [13] The liquid in the human body that the female mosquito sucks out.

Down

- [1] A very common insect; the females bite to obtain blood.
 [3] The act of piercing the skin with a "mouth part" (teeth, needles, fangs).
 [5] The signs of a disease that are used to determine a diagnosis.
 [6] A substance that drives away or wards off a mosquito.
 [8] A general term for an organism (like a bacteria or virus) that lives in or on a host organism and causes harm to that host.
 [9] A facility that provides medical and surgical care.
 [10] An injection used to prevent an infection or disease.
 [11] A person trained and licensed to practice medicine.

Answers

Infection Detection Waiting Room Crossword #4



Across

- [3] An injection used to prevent an infection or disease.
 [5] The liquid in the human body that the female mosquito sucks out.
 [7] A person receiving medical care or treatment.
 [8] A facility that provides medical and surgical care.
 [10] The act of identifying a disease.
 [11] The signs of a disease used to determine a diagnosis.
 [13] A very small agent (regarded as nonliving) that can be transmitted from a mosquito to a human; causing disease or illness in the human.

Down

- [1] Condition causing signs and symptoms of illness.
 [2] A person trained and licensed to practice medicine.
 [4] A substance that drives away or wards off a mosquito.
 [6] The act of piercing the skin with a "mouth part" (teeth; needles; fangs)
 [7] A general term for an organism (like a bacteria or virus) that lives in or on a host organism; and causes harm to that host.
 [9] A general term for any agent (like a bacteria or virus) that causes a disease.
 [12] A very common kind of insect; the females bite to obtain blood.

Mosquito Tellers

Taking inspiration from the popular children's "fortune teller" game, these resources serve to familiarize participants with the scientific concepts related to the container mosquito species being studied by the [GLOBE Observer](#) Mosquito Habitat Mapper app.

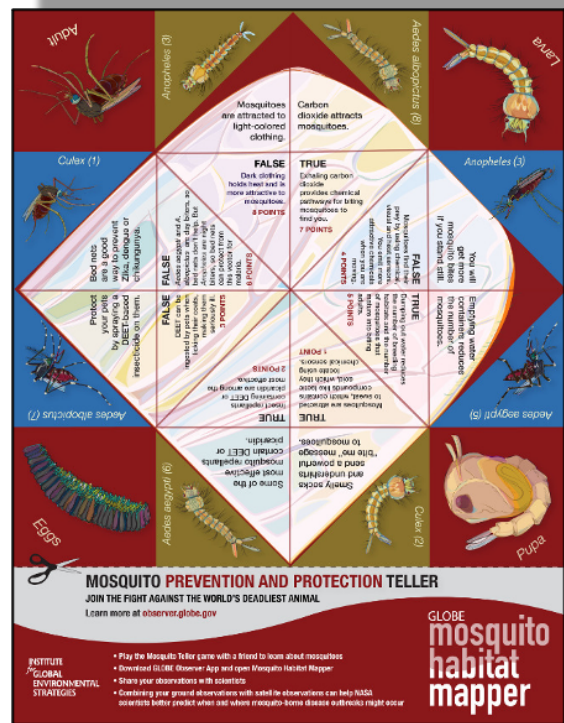
There are six different Tellers, each with a specific focus. They are:

1. Mosquito Prevention and Protection
2. Mosquito Biology
3. Mosquito West Nile Virus
4. Mosquito Zika and Dengue
5. Mosquito Malaria
6. DIY (create your own game)

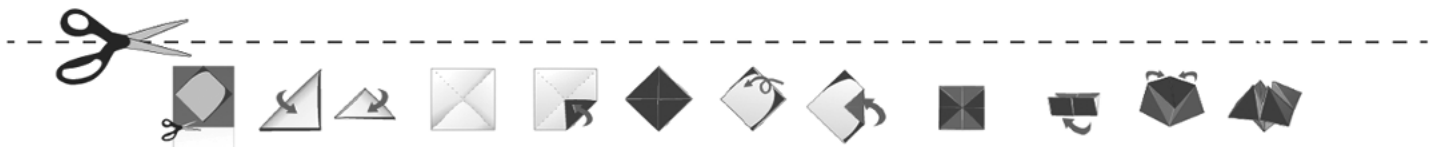
[Full-Color Version](#)

[Reduced-Ink B&W Version](#)

[DIY Version](#)



Directions are included to cut and fold the Teller and to Play the Mosquito Teller Game.



PLAY THE MOSQUITO TELLER GAME, TALLY YOUR POINTS, SWITCH ROLES AND THEN ... PLAY AGAIN!!!

Work in pairs. One person operates the Teller, and the other plays for points by choosing images, words, then numbers on the flaps.

- Pick a life cycle stage (4 outside corners). Spell the word out loud; open and close the Teller one time in alternate directions for each letter (e.g., P-u-p-a). End with Teller open.
- Pick an image of a mosquito larva or adult. Open and close the Teller for each syllable while pronouncing the species name (eg: Culex is 2 moves). End with Teller open.
- Pick a number, open the flap, ask the question, and keep score of points for correct answers.

Learn more at observer.globe.gov Download Mosquito Tellers (Prevention, Biology, West Nile, Zika and Dengue, Malaria, Blank), extended ideas and more

Zika Zine

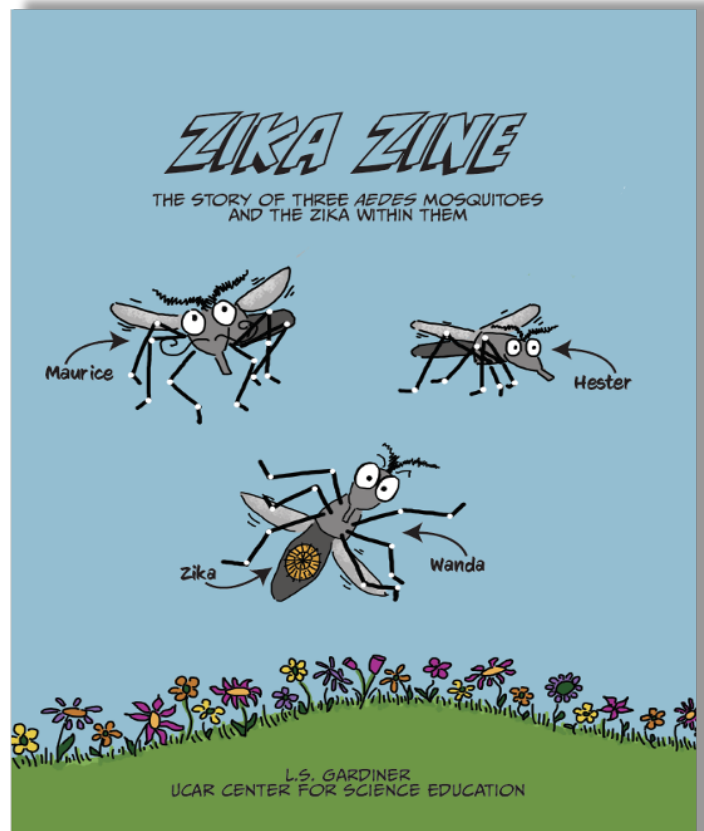
Meet Hester, Maurice, and Wanda. Three fictional mosquitoes providing insights into the lives of real *Aedes* mosquitoes, carriers of the Zika virus. Through the Zine, readers can learn about mosquito habitats, how to decrease their proliferation, and the involvement of citizen scientists using NASA's GLOBE Observer.

The Zika Zine is available in Available now in 10 languages: **English, Spanish, French, Dutch, Hindi, Nepali, Portuguese, Tagalog, Thai, and Vietnamese.**

Read the Zika Zine at:

<https://scied.ucar.edu/zikazine>

Use [How to Draw Wanda in 9 Easy Steps](#) and then [Make Your Own Zika Zine Comic](#) to tell your own mosquito story in a comic strip format.



HOW TO DRAW WANDA IN 9 EASY STEPS

FOLLOW THE STEPS BELOW TO DRAW WANDA THE CARTOON MOSQUITO.

