

# From Birds to People: The West Nile Virus Story



## About This Worksheet

This worksheet complements the Click and Learn “From Birds to People: The West Nile Virus Story.”

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## Learning Objectives

- Think about how infectious diseases spread, and how they can be contained.
- Learn about the many factors that affect the spread of a mosquito-borne infectious disease.
- Understand the difference between the infectious agent, vector, and host, and that some hosts play a role in spreading a virus and others don't.
- Learn about what makes a vector effective in spreading an infectious disease.
- Understand that viral infection can have different effects in different hosts and in different individuals.
- Gain an appreciation for the range of studies needed to understand mosquito-borne diseases.

## Instructions

1. Go to [BioInteractive.org](http://BioInteractive.org).
2. On the left, mouse over Topics – Infectious Diseases – Interactive.
3. Scroll down and click “[From Birds to People: The West Nile Virus Story.](#)”
4. Proceed through the slides, watch the embedded video clips, and answer the following questions in the spaces provided.

## Questions

1. Based on the Learning Objectives, what organism is the disease-carrying **vector** discussed in this interactive?

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2. Write a summary sentence that explains why scientists study West Nile virus.

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3. What group of animals tends to be affected most severely by West Nile virus?

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4. When and where was West Nile virus first detected in the United States?

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5. a. What bird species was most noticeably impacted by West Nile virus when the virus was first detected?

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b. Was this the only bird species affected by the virus? Explain your answer.

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c. What is one question that scientists are trying to answer regarding West Nile virus infections in birds?

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6. a. In what year did West Nile virus infections peak in the United States? \_\_\_\_\_

b. Which states were most affected? \_\_\_\_\_

c. How many cases of human disease were detected in *your* state? \_\_\_\_\_

d. Compare the prevalence of West Nile virus infections when the virus was first detected to when it peaked.

Support your observations with data from the maps.

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7. a. How severely are humans affected by West Nile virus infection?

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b. According to Dr. Kilpatrick, what are the odds of contracting West Nile virus from a single mosquito bite?

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c. Out of 10 people infected with the virus, how many will develop symptoms? \_\_\_\_\_

d. What percentage of people with symptoms exhibit brain inflammation? \_\_\_\_\_

8. Which state was most affected by West Nile virus infections in 2012? \_\_\_\_\_

9. a. What is the West Nile virus genome composed of?

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b. What happened to the West Nile virus genome that resulted in a new strain of the virus?

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c. Describe one advantage that the new virus strains had compared to the strain that was first detected in the United States.

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10. a. Studying West Nile virus infection and spread can provide insights into other viral diseases. Name two of them.

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b. What do these diseases have in common with West Nile virus infection?

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11. a. West Nile virus isn't transmitted directly from bird to bird or bird to human. How does the virus spread from one organism to another?

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b. In your own words, what is a vector?

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12. a. Watch the video of how a virus is spread by mosquitoes. Where in the body of a mosquito does the virus replicate, or make more copies of itself?

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b. To what organ inside the mosquito does the virus have to spread before the mosquito can infect other organisms?

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13. What genus of mosquitoes are the main vectors for West Nile virus in the United States?

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14. Explain in your own words three factors that make a vector effective in spreading a virus.

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15. What is meant by "host" when discussing a mosquito-borne infection?

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16. a. What percentage of mosquito species in North America has been found to be infected with West Nile virus?

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b. What makes the *Culex pipiens* mosquito species a highly effective vector for West Nile virus?

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17. a. An amplifying host is a host in which the level of pathogen can become high enough that a vector, such as a mosquito that feeds on it, will probably become infected. What is the amplifying host for West Nile virus?

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b. What is meant by the phrase, "Humans are a dead-end host"?

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c. How do humans become infected with West Nile virus?

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d. What is one difference between the mosquitoes that spread yellow fever and dengue and the mosquitoes that spread West Nile virus?

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18. Name two factors that determine how infectious a host is for West Nile virus.

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19. a. How do scientists know that robins are the preferred host for West Nile virus?

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b. What are two possible explanations for why mosquitoes feed more commonly on robins than on other birds?

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20. How do scientists know that there are more mosquitoes in the canopies than closer to the ground?

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21. What climate conditions are thought to have affected West Nile virus transmission in 2012?

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22. a. Describe two ways in which temperature affects the spread of West Nile virus infection.

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b. Why do scientists want to know how temperature affects virus transmission?

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23. List three types of data that Dr. Kramer and Dr. Kilpatrick collect.

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24. Look at the diagram on slide 21. What factors in the environment affect both the vector and the host?

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25. Why are human vaccines not effective in preventing the *spread* of West Nile virus?

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26. Can you think of additional strategies for stopping West Nile virus spread that are not mentioned on slide 23?

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## Extension Questions

As you proceeded through this activity, you may have thought of some questions about West Nile infection. In the space provided here, write one such question.

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Propose a testable hypothesis related to your question above.

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Propose an experiment to test your hypothesis. Be sure to name the variables you will be measuring.

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How will data be collected?

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Will the data be qualitative or quantitative?

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What will these data tell you?

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The BioInteractive website ([www.BioInteractive.org](http://www.BioInteractive.org)) features virtual labs, animations, and other engaging instructional materials. They can be used to supplement the lecture topics or to learn important concepts in the biomedical sciences.

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