

## Teacher's Guide: Solving a Public Health Problem

Recommended Grade Level: 5-8

*(also applicable to grades 9-12 for students requiring significant support in learning)*

Suggested Time: About 50-60 minutes spread over one or more class periods, plus additional time to complete a writing assignment

---

### Goals

Following are the big ideas that students should take away after completing this lesson:

- Public health workers follow a step-by-step process in their investigations.
- Health professionals from many different fields play a role in protecting the public health.
- Collaboration is important in public health investigations.

---

### Vocabulary

(See definitions on page 6.)

- collaboration
- infection
- investigation
- outbreak
- symptom
- transmission

---

### Key Literacy Strategies

Following are the primary literacy strategies students will use to complete this activity:

- Making inferences (screens 5 and 9; writing assignment 2)
- Sequencing events (screens 8 and 12; writing assignment 1)
- Understanding problem/solution (screens 8 and 12; writing assignment 1)
- Determining important information (screen 10; writing assignment 1)
- Constructing summaries (writing assignment 2)

Note: In addition to the key literacy strategies listed above, students will also use each of these strategies to complete this lesson:

- Monitoring comprehension
- Synthesizing
- Making predictions
- Developing vocabulary
- Connecting prior knowledge to new learning
- Developing a topic in writing
- Identifying and using text features (photographs, captions, diagrams, and/or maps)

---

### Overview

*Solving a Public Health Problem* is a student-directed learning experience. However, while students are expected to work through the lesson on their own, teachers should be available to keep the lesson on track, organize groupings, facilitate discussions, answer questions, and ensure that students meet all learning goals.

The following is a summary of the lesson screens:

- Screen 1: Students begin to think about how people get answers about mystery diseases in their community.
- Screen 2: Students read about the job that public health workers perform in communities and in the workplace and learn about the difference between public health professionals and medical practitioners. They also learn the purpose for the lesson: to look at what happens when there is a suspected outbreak of a disease, and see how public health workers solved a public health mystery—protecting the communities they served.
- Screen 3: Students learn what the goals are for the lesson, which strategies they will be using to complete the lesson, and the important vocabulary words they will use during the lesson.
- Screen 4: Students read about disease transmission and learn how public health workers respond to illness caused by infection.
- Screen 5: Students watch a video about an outbreak of a mysterious and deadly disease and how doctors in different fields collaborated to diagnose the cause of the disease. After viewing, students write down similarities in the work of the three different kinds of public health doctors featured in the video.
- Screen 6: Students read more about the challenging nature of public health investigations and the initial steps that public health investigators take when they suspect an outbreak.
- Screen 7: Students watch a continuation of the video that began on screen 4. The video reveals additional steps in the outbreak investigation process.
- Screen 8: Students read more about how three different public health agencies worked together to correctly diagnose the disease as West Nile virus. Students then write down two to three sentences about how the doctor at the zoo helped the investigators determine that West Nile virus was the cause of the outbreak.
- Screen 9: Students read a passage about the importance of collaboration among various parties in protecting the public health and then write down why they think human doctors and animal doctors should sometimes share information.
- Screen 10: Students answer three multiple-choice questions to show their comprehension of the diseases discussed in the videos as well as public health investigations.
- Screen 11: Students complete an interactive vocabulary activity, and then choose two words from the vocabulary list and write a new sentence for each word. These tasks demonstrate their understanding of the meanings of the words.
- Screen 12: Students use an interactive activity to sort information on a concept map based on the sequence of steps in a disease outbreak investigation.
- Final Assignment: Students select and complete a writing assignment about the lesson topic.

---

## Before the Lesson

- ❑ Go through each screen of the lesson, including all the interactive activities, so that you can experience ahead of time what students will be doing. As you go through each screen, jot down your own expectations for students' responses.
- ❑ Determine if students will be working individually or in pairs on the lesson. Some students may be able to work independently with little or no support. Students who are less familiar with the subject area or who struggle with literacy skills may benefit from working with another student. An effective way to do this is to pair a stronger student with a less able reader. You can also have students work individually on certain tasks and in pairs on others, depending on their experience and needs. If students will be working in pairs on any portion of the lesson, let them know if they will be expected to type in their notes individually or together.
- ❑ Provide instruction on key vocabulary (vocabulary words are defined in the lesson on screen 3, and on page 6 of this guide).
- ❑ Determine what students already know about public health and disease transmission. Record their ideas on a chart. You may want to structure the chart with two questions: "How are diseases transmitted?" and "What do public health workers do to protect us from disease?" This will give you a sense of the background knowledge and possible misconceptions that students have before beginning this lesson. If time allows, return to the chart after students have completed the lesson to add new learning and correct misconceptions. Note: You may want to record their new learning in a different-colored ink so they can see how much they've learned.
- ❑ Arrange computers with Internet access so students can work individually or in pairs.
- ❑ Before students begin, suggest a timeline for completing the lesson, mention the different types of media they will encounter, and let them know how you expect them to submit their work. You may want to provide an outline of this information on a chart, chalkboard, or whiteboard, or as a handout.

---

## Lesson Assessments

The following are descriptions of the lesson features that will be part of the packet of materials that students will submit. Students will use the packet for reference when writing their final assignment. It also serves as a formative assessment tool to monitor students' work as they are progressing through the lesson.

- **Notes** - Students take notes on screens 5, 8, and 9. If time allows, review their notes before students begin their writing assignment.
- **Multiple-choice questions** - Students complete the three questions on screen 10. Walk around to make sure students answer all three questions before they continue. If students click to go to the next page before they finish, their work will not be saved.
- **Match It!** - Students complete an interactive vocabulary activity on screen 11. They begin by dragging the vocabulary terms into the correct sentences. After they finish and save

their work, they will be able to check their answers against an answer key. When they are done, they will be asked to choose two vocabulary words and write a new sentence for each word. Sentences should demonstrate a clear understanding of the meaning of each word. An inappropriate response would be “The man had a symptom.” An appropriate response would be “Swelling of the brain is a serious symptom of a medical problem.”

- **Arrange It!** - Students complete the concept map activity Arrange It! on screen 12. Students will assign information according to when each step takes place during a disease outbreak investigation. Students will not be able to check their answers online, so you will need to provide them with correct answers when they are finished with the lesson. You can choose to review the answers as a class or return the corrected packet of materials to students before they begin the final assignment.

The terms that students will drag and drop onto the concept map in the appropriate space (information in bold will be provided) are as follows:

**Scenario:**

**A patient enters a hospital with unusual symptoms. A doctor diagnoses an illness and reports it to the public health office you work in. Is this the start of a disease outbreak? What steps should you take to find out?**

**To confirm whether the reported symptoms match the diagnosis, you need to:**

- Investigate the area where the patient got ill
- Interview patients, family, neighbors
- Look for other reported cases
- Order lab tests

**Based on the information you’ve gathered and test results:**

- Suggest an idea about the cause of illness
- Test your idea about the cause of illness

**If tests confirm your idea, take action to:**

- Control the outbreak
- Inform the public

- **Final Assignment** - Students complete one final writing assignment. You can choose to let students make their own selection or assign one according to your goals for the lesson. Use the rubric on page 7 to assess the writing assignments.

---

## **Lesson Aids and Extensions**

Use the following suggestions to help students if they are stuck on a particular screen, as follow-up discussions to reinforce learning, and to prepare students for completing their writing assignments.

- **Watching Videos** - Encourage students to watch the videos more than once. After the initial viewing, provide students with a specific content focus to frame their next viewing(s) of the video. This will help them draw connections between the main topic and the information that the videos have to offer.

- **Participating in Discussions** - Organize class discussions or encourage students to talk about their questions in pairs. You may want to use the following discussion starters:
  - o What disease outbreaks have you heard about lately in the news?
  - o Have you ever been told by your school nurse or your doctor how to lower your chance of getting a disease? What did they suggest you do (or not do)?
  - o Why do you think the different public health agencies in the West Nile virus investigation did not communicate or work together at first? How might the investigation have changed if they had?
  - o How does the work of public officials protect us from disease?
- **Reading the PDF Text** - Before they read the PDF text on screen 9, ask students for some reasons why they think it can be difficult for different public health agencies to share information with one another.
- **Sharing Student Work** - It may be motivational, and a further learning opportunity, for students to post their final essays so that their classmates, peers, and/or parents can see them. This may also provide an opportunity for students to comment on and discuss each other's essays.
 

If you do not already have access to an online writing community, Teaching Matters™ provides TeXT, free classroom publishing tools that allow teachers and students to create and publish their own online eZine. More information and a free signup are available at Teaching Matters: TeXT (<http://text.teachingmatters.org>).
- **Reflection and Self-Assessment** - After students have turned in their writing assignments, you can choose to have them assess their learning. Bring students together as a whole class or in small groups to discuss the questions below. You may want to return to the chart of their ideas developed before the lesson and record their new learning. You may also have students respond individually to the questions, and then convene the class to discuss the chart.
  - o What did you learn?
  - o What was surprising?
  - o What questions do you still have?
  - o What was the easiest for you to understand and do?
  - o What was the most difficult?

---

## **Vocabulary Definitions**

### **collaboration**

Working together to produce or create something.

### **infection**

When a virus, bacteria, or some other tiny organism that can cause damage or disease enters a body; an infectious disease is a disease that spreads through infection.

### **investigation**

The act or process of carefully looking into something.

### **outbreak**

A sudden increase, as of a disease.

### **symptom**

A change in the body that is a sign of disease.

### **transmission**

The passage or transfer of a disease from one living thing to another.

## Final Assignment Rubric Solving a Public Health Problem

- Public health investigations generally follow certain steps to investigate a public health problem. Explain the steps public health officials took to diagnose West Nile virus.
- When public health agencies work together, it can help the investigation of a disease outbreak. Explain how collaborations led to the correct diagnosis during the West Nile virus investigation. Be sure to describe what happened when groups failed to work together early on in the investigation.

4	3	2	1
<p>Provides a clear and accurate response to the question. Ideas are elaborated, with three or more relevant supporting details from the reading passage, video, and other materials in the lesson.</p>	<p>Provides an adequate response to the question. Topic and ideas are generally well organized, with two relevant supporting details from the reading passage, video, and other materials in the lesson.</p>	<p>Provides a generally accurate response, with one supporting detail from the reading passage, video, and other materials in the lesson.</p>	<p>Provides an inaccurate response to the question or fails to address the question. May include misinterpretations. Understanding of the topic is not apparent.</p>
<p>Uses at least three vocabulary words (or a form of the vocabulary words) from the lesson, and uses them all correctly.</p>	<p>Uses two vocabulary words (or a form of the vocabulary words) from the lesson, and uses them both correctly.</p>	<p>Uses one vocabulary word (or a form of the vocabulary word) from the lesson, and uses it correctly.</p>	<p>Does not use any vocabulary words, or uses vocabulary words incorrectly.</p>

---

## Scoring the Rubric

Here are two suggestions for scoring the final assignment rubric. Select the option that best meets your needs or develop your own grading system.

**Option 1:** This option provides one score for each submitted assignment.

Assign a score of 4 or below for the written response (first row of the rubric) and a score of 4 or below for the use of vocabulary (second row of the rubric), for a total maximum score of 8. The interpretation of scores is as follows:

Score	Grade	Narrative Interpretation
7-8	A	Excellent
5-6	B	Good
4	C	Adequate (Fair)
3 or below	D	Minimal

**Option 2:** This option provides two scores for each submitted assignment: one for written content and one for the use of key vocabulary. An advantage of separate scores is that you can weight students' comprehension and composition differently than you do their knowledge of vocabulary. It can also help you identify specific needs for future instruction.

Assign a score of 4 or below for the written response (first row of the rubric) and a score of 4 or below for the use of vocabulary (second row of the rubric) and then score them separately. The interpretation of scores is as follows:

Score	Grade	Narrative Interpretation
4	A	Excellent
3	B	Good
2	C	Adequate (Fair)
1	D	Minimal

The final grade may look like this: A/B (A for content and B for vocabulary use).