

Investigations in Infectious Disease using the Claim, Evidence, Reasoning Framework: Outbreak on the Hospital Ship USNS Relief

This is a **PREVIEW** of Investigations in Infectious Disease using the Claim, Evidence, Reasoning Framework (2 Lessons)

The full curriculum includes two classroom lessons with a video demonstration of a DNA fingerprinting experiment.

To request the full version of this curriculum at no cost, go to <https://www.adventurelab.org/nih-sepa-grant-project.aspx> and fill out the request form.

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The activities described in this manual are intended for school-age children under direct supervision of adults. The authors and Seattle Children's cannot be responsible for any accidents or injuries that may result from conduct of the activities, from not specifically following directions, or from ignoring cautions contained in the text.

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How to decide which version is best for your classroom:

Where are you located?	How much time is available?	How many classes are participating?	Version	Description
Western Washington	5 lessons, including a 1-hour mobile lab visit	3-5 (30 students max per class)	Investigations in Infectious Disease Mobile Lab Version	5 days, includes a mobile Science Adventure Lab visit to your school
Puget Sound area	5 lessons, including a 3-hour field trip	1 (32 students max)	Investigations in Infectious Disease Field Trip Version	5 days, includes a field trip to the Science Discovery Lab in downtown Seattle; transportation assistance is available
Any location	4 lessons	Not limited	Investigations in Infectious Disease Classroom Version	Classroom activities (4 days)
Any location	2 lessons	Not limited	Investigations in Infectious Disease Using the Claim, Evidence, Reasoning Framework	Classroom activities (2 days)
Any location	1 lesson	Not limited	Introduction to Epidemiology of the COVID-19 Pandemic: Featuring Infectious Disease Researchers	Video and reading
Any location	20 minutes	Not limited	Epidemiological Investigation of the COVID-19 Pandemic Student Reading	Reading

Investigations in Infectious Disease using the Claim, Evidence, Reasoning Framework: Outbreak on the Hospital Ship USNS Relief

Grades: 7-9

Subject: Science, ELA

Estimated Time: Two 50-60-minute lessons

Lesson Overview: Students will be introduced to the steps in an epidemiological investigation using a simulated outbreak of infectious disease onboard a hospital ship as an example. They are led through the three general parts of an epidemiological investigation, which are 1) Gathering information and preparing case reports, 2) Defining how the infection is spreading and identifying the source, and 3) Implementing control and prevention measures. Students will watch a video that demonstrates the laboratory technique DNA fingerprinting and learn how to interpret the results of the experiment to identify the source of the infection. Students will use the evidence collected from the reading and the video to answer the essential question “*What caused the crew and passengers to become ill on the USNS Relief in August of 2018?*” and complete a Claim, Evidence, Reasoning framework.

Standards:

This lesson supports the *Understanding about the Nature of Science* standards and provides an opportunity to practice the Claim, Evidence, Reasoning framework.

Source: Appendix H – Understanding the Scientific Enterprise: The Nature of Science in the Next Generation Science Standards www.nextgenscience.org/resources/ngss-appendices.

Specific Learning Outcomes:

Students will be able to:

1. Identify the phases in an epidemiological investigation.
2. Differentiate between outbreak, epidemic, and pandemic and explain how an outbreak progresses to an epidemic and pandemic.
3. Identify gel electrophoresis as a laboratory technique that separates DNA fragments according to their size.
4. Identify DNA fingerprinting as a laboratory technique used to compare patterns in DNA.
5. Learn how to interpret results of a DNA fingerprinting experiment and draw conclusions.

Key Vocabulary:

- DNA fingerprint
- DNA fingerprinting
- Epidemic
- Epidemiology
- Epidemiologist
- Gel electrophoresis
- Infectious disease
- Microorganism
- Outbreak
- Pandemic

SAMPLE: Lesson Plan Day 1

Introduction

1. Read the following introduction to students.

Over the next two lessons we are going to complete an activity designed by Seattle Children's about how infectious diseases are investigated. The study of infectious diseases and how they spread is called epidemiology. We will learn about some of the key steps of an epidemiological investigation and how they can be applied to a simulated outbreak of foodborne illness on a hospital ship. In the provided reading, we will learn about the background knowledge and terminology that an epidemiologist (a scientist who studies patterns and causes of disease) needs to know in order to be able to successfully launch an investigation. We will read about an outbreak of infectious disease on a ship that serves as a floating hospital. We will watch a video to help us determine what type of infection it is and how it is spreading and learn about the laboratory techniques, gel electrophoresis and DNA fingerprinting, which can be used to identify the source of the outbreak. After the video, we will interpret the results of the experiment. At the completion of the lessons, we will have gathered evidence about the source of the infection and how it spreads so you can state a claim and provide the reasoning for that claim.

2. Distribute student manual.

- a. Teachers may also send the Student Manual to students electronically.
- b. Teachers may also use a document camera to display the pages of the manual.

3. Ask students to read the article (pages 1-6 of the Student Manual) individually or as a group activity.

- a. Phases of an Epidemiological Investigation.
- b. Introduction.
- c. Outbreak, Epidemic, Pandemic.
- d. Outbreak on the USNS Relief.
- e. Five Suspect Foods.
- f. Laboratory techniques are used to compare DNA samples from bacteria.
 - i. Gel Electrophoresis.
 - ii. DNA Fingerprinting.

Reading