



### **Activity 1: Disease Detectives**

An epidemiologist is like the Sherlock Holmes of the medical world. An epidemiologist acts like a disease detective and investigates a health problem by looking for clues. In this activity, the student will learn about epidemiology and the process epidemiologists use to determine the source of an unknown disease.

### **Background**

If a person enters a grocery store and robs the cashier, the question of, “Who stole the money?” is easy to answer. But what if nobody entered the store and the money had just disappeared, how would you find out who stole the money? In this case, you may need a super-sleuth to help uncover the culprit. Someone who knows certain details about the grocery store might be able to find hidden clues and draw connections between people, place, and time. Disease detectives or epidemiologists work the same way. Many illnesses have a clear path to the causative agent. We all know that if we cut ourselves, certain bacteria can enter our body and cause an infection. But some illnesses are tricky. Some infectious agents enter our body through less obvious methods. Just like the case of the disappearing money, some diseases require a more cunning and knowledgeable crime fighter, or in this case, a disease detective.

Epidemiology is the branch of science that tries to decipher the occurrences and causes of a health problem in a specific population. For instance, if an outbreak of a disease occurred on a university campus, a disease detective would try to find out not only what the disease is, but also why it occurred at the university. In order to answer these questions, disease detectives apply the scientific method as the basis for their investigation. Given a specific health problem, the epidemiologist will gather information and then make a hypothesis as to the answer to the problem. The epidemiologist must be able to test the hypothesis to see if it is true.

In this activity, students will learn about the different studies an epidemiologist uses in order to uncover the source of a mystery disease. Then, students will practice generating a hypothesis given a set of clues.

*This activity is an adaptation of *Detectives in the Classroom* by Mark Kaelin, Ed.D. Montclair State University: <http://www.montclair.edu/detectives/>*

## Disease Detectives

### Learning Objectives

The student will:

1. learn about the scientific field of epidemiology.
2. use the principles of the scientific method to investigate the cause of an unknown disease.

### Materials

1. *Student Guide*
2. *Disease Detective* slides
3. *Descriptive Epi Sheet*
4. “*What’s My Hypothesis?*” chart
5. index cards, one per student
6. *Pretend Disease List*

### Procedure

1. Before class, create the number of *Pretend Disease Cards* required (one per student). Do this by reviewing the *Pretend Disease List*. Write the disease on one side of a blank index card and number the card in the top right-hand corner. (For example, SUNGLASSES, #21)
2. At the beginning of class, introduce the study of epidemiology by using the *Disease Detective Slides* available on the MedMyst web site, <http://medmyst.rice.edu/html/mat2.html>
3. The slides can be viewed with Microsoft PowerPoint® viewer. Use the notes option in PowerPoint® to view a detailed explanation of the slides.
4. After you have reviewed an epidemiology descriptive study and the activity, separate the class into groups. The activity can be done with the entire class, but this may take more time.
5. Give each student a *Pretend Disease Card*, a *Descriptive Epi sheet*, and a “*What’s My Hypothesis?*” chart.
6. Have the students write the number on their card in the bottom right-hand corner on the *Descriptive Epi sheet*. Make sure they do not show anyone what their card says.
7. Then have the students write clues as to: (1) type of person who would get their disease, (2) the place they would get their disease and (3) the time of day they would get their disease. Since other students will use these clues to guess the disease, prompt the students to write very descriptive clues.
8. After everyone has finished writing their *Descriptive Epi Sheet*, take up the *Pretend Disease Cards*.
9. Have the students within each group trade *Descriptive Epi sheets*. Each student should read each group members *Descriptive Epi Sheet*, and try to formulate a hypothesis as to what the cause of the disease is. The student should write each hypothesis in the *My Hypothesis* column on the “*What’s My Hypothesis?*” chart next to its corresponding number.
10. Have the students continue trading *Descriptive Epi sheets* until everyone has formulated a hypothesis for each *Descriptive Epi Sheet* in their group.
11. Then have the students review the hypothesis for each disease, and determine if it is a good hypothesis and discuss why. If a student likes someone else’s hypothesis, have them write it in the *Other Hypothesis* column.
12. The final step is to reveal the disease and which hypothesis was correct.

## **Disease Detectives**

### **Extension Activities**

- *History*: Investigate famous disease epidemics.
- *Social Studies*: Using your local newspaper, find examples of health problems found in your community. Conduct a discussion of these problems.
- *Language Arts*: Interview the local public health officer about the epidemiological studies with which he/she has been involved.

### **Related Standards**

National Science Education Standards, Grades 5-8

Science Content Standard A:

- All students should develop abilities necessary to do scientific inquiry
- All students should develop understanding about scientific inquiry

### **Books**

- Yount, L. (2001). Disease Detective. San Diego, CA: Lucent Books.
- Drexler, M. (2002). Secret Agents: The Menace of Emerging Infections. Washington, D.C.: Joseph Henry Press
- Tierno, P.M. (2001). The Secret Life of Germs. New York, NY: Pocket Books..

### **Web Sites**

- Excellence in Curriculum Integration Through Teaching Epidemiology  
<http://www.cdc.gov/excite/index.htm>
- Detectives in the Classroom  
<http://www.montclair.edu/detectives/>

## **Pretend Disease List IMAGINE THAT THESE ARE DISEASES**

Consider using the following on the 3 x 5 cards (Remember to number them so that the pretend disease can be identified by its number).

- AOL
- Aspirin
- Apples
- Being left-handed
- Braids
- Candles
- Cats
- Cellular telephones
- DVDs
- Dogs
- Donuts
- Eating breakfast
- Heavy backpacks
- Electric power
- Eye shadow
- Hairspray
- Headsets
- Lip gloss
- Leather
- MP3 players
- MTV
- Phone receiver
- Paint
- PlayStation2
- Razor scooter
- Snow
- Spray cans
- Swimming pools
- Tents
- Skateboards
- Violent video games



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### Materials

1. *Student Activity Sheet*
2. *Disease Detective slides*
3. *Descriptive Epi Sheet*
4. “*What’s My Hypothesis?*” *Chart*
5. *Pretend Disease Card*

### Procedure

1. After you have reviewed the study of epidemiology with the class, separate into groups.
2. Get a *Pretend Disease Card* from your instructor.
3. Write the number from the card in the bottom right-hand corner on the *Descriptive Epi Sheet*. Do not show anyone what your card says.
4. On your *Descriptive Epi Sheet*, think of clues that would describe a person who would get this disease, where they would contract this disease, and at what time they would get this disease. Try to use the “whistle” example that was described to you to shape your clues. Be as descriptive as you can, since the clues will be used so that other students can try to guess the disease.
5. After everyone has finished writing their *Descriptive Epi Sheet*, turn in your *Pretend Disease Cards* to your instructor.
6. Trade *Descriptive Epi Sheets* with the person on your right in your group. Each student should read each group member’s *Descriptive Epi Sheet*, and try to formulate a hypothesis as to what the cause of the disease is. You should write your guess for each disease in the form of a hypothesis in the *My Hypothesis* column on the “*What’s my Hypothesis?*” *Chart*, next to its corresponding number.
7. Continue trading *Descriptive Epi sheets* until you have formulated a hypothesis for each *Descriptive Epi Sheet* in your group.
8. After you have guessed the source of the disease for everyone in your group, review each entry with your group, and determine who has a good hypothesis and why. If you like someone else’s hypothesis, write it in the *Other Hypothesis* column of your “*What’s my Hypothesis?*” *Chart*.
9. Finally, take turns revealing the source of the disease for everyone in your group, and determine which hypothesis was correct.

**Disease Detective  
Descriptive Epi Sheet**

**Name:** \_\_\_\_\_

**Person:**

**Place:**

**Time:**

**Card #:** \_\_\_\_\_

