

## THE SCIENCE OF FRINGE

### EXPLORING: COMMUNICABLE DISEASES

A SCIENCE OLYMPIAD THEMED LESSON PLAN  
SEASON 3 - EPISODE 7: **THE ABDUCTED**

**Overview:**

Students will learn about vaccination and the spread of communicable diseases.

**Grade Level:** 9–12

**Episode Summary:**

The Fringe team investigates the abduction of a child, discovering that a serial kidnapper named the “Candyman” has reappeared. The Candyman performs a medical procedure on his victims and then releases them 48 hours later, much weaker and afflicted with numerous diseases. As the team races against the clock to catch the Candyman, they follow many leads, including interviewing Broyles’ son, who is a previous victim.

**Related Science Olympiad Event:**

Disease Detectives - Students will use their investigative skills in the scientific study of disease, injury, health, and disability in populations or groups of people with a focus on food borne illness.

**Learning Objectives:**

Students will understand the following:

- Small agents known as pathogens cause communicable diseases.
- Pathogens can be transmitted from one person to another, spreading the disease.
- The spread of some communicable diseases can be prevented by immunization or vaccination.

**Episode Scenes of Relevance:**

- The Fringe team discusses the previous kidnappings
- Olivia and Broyles interview Reverend Marcus
- View the above scenes: <http://www.fox.com/fringe/fringe-science>

**FOX CODE**



**FOR SMARTPHONES**

## Online Resources:

- Fringe “The Abducted” full episode: <http://www.fox.com/watch/fringe>
- Science Olympiad Disease Detectives event: [http://soinc.org/disease\\_detectives\\_c](http://soinc.org/disease_detectives_c)
- Centers for Disease Control and Prevention Education Site: <http://www.cdc.gov/education/>
- Wikipedia entry on Infectious Diseases: [http://en.wikipedia.org/wiki/Infectious\\_diseases](http://en.wikipedia.org/wiki/Infectious_diseases)

## Procedures:

1. Tell your students that they are going to learn about communicable diseases.
2. Have your students research different types of diseases, including prevention and treatment, in resources such as health textbooks and websites and discuss what they have learned.
3. Have your class complete the following activity:
  - a. Materials: bag for each student with 30 pieces of small candy (such as M&Ms, Mike and Ike’s, Jelly Beans, etc.). Make one bag with a different type or color of candy (the “infected” candy), making sure that the other 29 bags do NOT contain any of the “infected” candy (i.e., 29 bags of mixed, non-green M&Ms, 1 bag of green M&Ms). Use brown paper bags or other non-transparent bags to hide the contents until the students begin randomly trading.
  - b. Tell the students to spend 3-5 minutes trading candy with one another, 3 pieces at a time. Make sure the trading is random (do not indicate which is “infected” or “normal” candy) and allow students to trade more than once with each other.
  - c. Reveal which candy was the “infected” sample and have the students count the number of “normal” and “infected” candies they ended up with at the end of the trading period.
  - d. Make a plot for the number of infected versus normal candies each student has collected.
4. Discuss with the class the results of the activity. Be sure to address:
  - a. The “infection path” of the disease; were there secondary infections that didn’t come from the original student?
  - b. How would having multiple “infected” students at the beginning of the activity affect the spread of the disease? What about if the class was much larger, like the whole school or even a city?
  - c. How would the activity have been different if some of the students’ were “vaccinated” against the disease by removing any “infected” candies they received and not putting them in their bag?

## Additional Discussion Suggestions:

- There are a variety of mechanisms for the transmission of infectious diseases. Discuss some of these mechanisms and what preventive measures can be utilized against them.
- Everyone is required to receive different immunizations against infectious diseases at various points in their life. What immunizations have your students received and how has this affected their lives? What immunizations will they have to receive in the future?

### **Extension to Other Subjects:**

**Social Studies/History:** There have been several instances of large-scale outbreaks throughout history, including the Spanish Flu in 1918 and the recent Swine Flu. Have your students research these outbreaks, what caused the large spreading of the disease and what steps are being taken to prevent them.

**Language Arts:** Have students read *The Hot Zone* by Richard Preston or *The Andromeda Strain* by Michael Crichton or watch the movie *12 Monkeys* and relate the issues in those books or film to everyday life. In addition, students can review and critique disease-related articles from tabloids and other papers for hyperbole and general scientific value.

**Biology:** Humans aren't the only organisms to get viruses; many other animals can get ill in a similar fashion. One significant current example is the massive Global Honey Bee crisis, which some scientists have theorized is caused by a viral infection. What are other significant animal viruses and how do these affect our daily lives?

### **National Science Standards Alignment:**

H.F.1 Personal and community health

b. The severity of disease symptoms is dependent on many factors, such as human resistance and the virulence of the disease-producing organism. Many diseases can be prevented, controlled, or cured. Some diseases, such as cancer, result from specific body dysfunctions and cannot be transmitted.

H.G.1 Science as a human endeavor

c. Scientists are influenced by societal, cultural, and personal beliefs and ways of viewing the world. Science is not separate from society but rather science is a part of society.