# CSI Forensics

Students become forensic scientists as they solve crimes. Students practice using paper chromatography, blood typing, fingerprint analysis, footwear impressions, gel electrophoresis, DNA extraction, and critical thinking skills to identify the culprit, uncover the root cause of epidemics, and learn how to prevent the spread of disease.

## Day 1

### To Catch a Thief

This workshop encourages students to use their investigative and problem solving skills to solve a crime. Using paper chromatography the students reveal the underlying composition of the four suspects’ pens and, utilizing the same scientific process on the ransom note, they are able to identify the criminal. (Code 296)

### Bandanna Chromatography

Chromatography is a technique used to separate mixtures. Many different science fields use chromatography. The technique is used in environmental studies to detect pollution in water and air. Chromatography also is used by crime laboratories to identify clues such as blood, ink, or other substances found at a crime scene. In this workshop students create their own colorful Bandanna design while learning about chromatography. Students will separate the ink from permanent colored markers to make a rainbow of colors on their Bandanna! (Code 506)

### Blood Typing

You are watching ER and, once again, the doctor yells out for some “O neg”. A patient is bleeding on the gurney. Many life-threatening conditions can be treated by giving the patient blood, but scientists and doctors must understand the problems that can be caused. Besides the complications from getting the “wrong blood type”, serious diseases can be spread through blood transfusions. Fortunately, blood tests can indicate blood type, and also what diseases might be carried in the blood. In this workshop, the students will see what happens if you mix the wrong types of blood together. (Code 225)

## Day 2

### Fingerprint Analysis

Students will explore the characteristics of fingerprints in these “fingers-on” activities, devising their own classification categories and applying their skills to solve a “crime”. Students will uncover their own finger prints. (Code 291)

### Footwear Impression

Can you identify the suspect by his or her footprints? This workshop introduces students to the techniques of footwear impression analysis. Some of our “foots-on” activities include: Using inkless forensic paper, students will cast classmates' shoes to see which matches the shoe print left at the scene of the crime; measuring the gait of a walking pace and then working backwards to infer their height from gait. (Code 420)

### His Hair, Her Hair, Whose Hair

Students will examine a set of hairs and cloth fibers with microscopes. Using their observational and critical thinking skills, they will develop a procedure to identify hairs and fibers collected from crime scenes. (Code 388)

## Day 3

### Strawberry DNA Extraction

Have you ever wondered what a forensic scientist has to do to analyze DNA evidence? DNA (the building blocks of life) is present in the cells of all living organisms. In forensic science DNA is usually extracted from human cells to identify unknown parentage, crime scene suspects, missing victims and to investigate genetic diseases. Since 1985, “DNA fingerprinting” has been used in legal cases around the world to link suspects to the scene of a crime. Students will extract DNA from fruit to see what it looks and feels like. (Code 86)

### Off to the Races

What molecule will be first to the finish line? To study highly purified materials and molecules that are similar in size and electric charge, scientists use gel electrophoresis. This technique is also used to separate DNA for genetic testing, determine susceptibility to disease, and conduct DNA fingerprinting to solve crimes. In this experiment, students will load their gel with six food coloring samples. The smaller the molecule and the more negative its charge, the closer it gets to the finish line. By determining where it finishes its "race", scientists can make a determination about the identity of the molecule. (Code 342)

### Fun with Fomites

Fomites?! What are fomites? They are inanimate objects that can carry disease-causing organisms. Your cutting board, kitchen sink, and even that pen you keep putting in your mouth are all fomites. But can you do anything to affect the number of organisms on a fomite? Students will investigate strategies for reducing bacteria on object surfaces. (Code 329)

### Epidemic

The ease with which pathogens can spread through a population is very relevant today as we cope the possibility of a flu epidemic. Using diluted acids and bases as “body fluids,” students will participate in a classroom simulation of a spreading epidemic. (Code 79)
**Forensic Dissection:** Students will examine in some detail the external and internal anatomy of a fetal pig (Sus scrofa). As the pig is a mammal, many aspects of its structural and functional organization are identical with those of other mammals, including humans. Thus, a study of the fetal pig is in a very real sense, a study of humans. (Code 422)

**Medical Detectives:** Calling all Medical Detectives! The workshop will introduce students to different tools and resources used by doctors and medical researchers. Students will act as Medical Detectives, using clues such as posters, dissection organs, prepared microscope slides and other diagnostic tools to solve mystery diseases. This series will allow students to learn about health problems encountered in the United States, both in the past as well as in the present. Each workshop will allot time to students to work as teams of detectives solving the medical mystery, followed by a discussion of the students' findings. (Code 606)