

Background Information
Forensic Science Laboratory Activity – Locard’s Principle
Read before the Lab!!



Edmond Locard (1877-1966) in 1920 persuaded the police department in Lyons, France, to give him two attic rooms and two assistants to start the world’s first police laboratory.

During his first years of work, the only instruments available to Locard were a microscope and a rudimentary spectrometer. However, his enthusiasm quickly overcame the technical and monetary deficiencies he encountered. From these modest beginnings, Locard’s research and accomplishments became known throughout the world by forensic scientists and criminal investigators.

It was Locard’s belief that when a criminal came in contact with an object or person, a cross-transfer of evidence occurred (Locard’s Exchange Principle). Locard strongly believed that every criminal can be connected to a crime by dust particles carried from the crime scene. This concept was reinforced by a series of successful and well-publicized investigations. In one case, confronted with counterfeit coins and the names of three suspects, Locard urged the police to bring the suspects’ clothing to his laboratory. Upon careful examination, he located small metallic particles in all the garments. Chemical analysis revealed that the particles and coins were composed of exactly the same metallic elements. Confronted with this evidence, the suspects were arrested and soon confessed to the crime.

Every time you make contact with a person or object there is an exchange of materials. This could mean the transfer of fibers, hairs, wood shavings, metal filings, tidbits of paper, or any small, lightweight item adherent to the donor object. This exchange enables forensic scientists to determine where someone has been based on trace evidence. It is even possible to track a person’s daily movements by examining his or her clothing.

Forensic Science Laboratory Activity – Locard’s Principle

Objectives:

1. Demonstrate how transfer of evidence occurs
2. Identify a possible crime scene location based on trace evidence examination

Materials (per group):

3 fabric squares in separate sealed evidence bags
1 white sock in sealed evidence bags
tweezers
hand lenses
1 roll of clear tape or masking tape
white paper
scissors
gloves

Safety Precautions:

Wash your hands before starting work
Refrain from touching hair, skin, or clothing when collecting evidence
Wear gloves while collecting evidence

Scenario:

A dead body has been found. The crime scene investigators determined that the body has been moved after the killing. Trace evidence was found on the victim’s sock. It was determined that the crime could have occurred in three possible locations. Can you match the trace evidence found on the victim’s sock with trace evidence collected from three different locations and determine which location was the crime scene?

Procedure:

1. Open a fabric square evidence bag from location 1 by cutting along an edge other than the signed, sealed one.
2. Using forceps/tweezers and a hand lens, examine and identify items found in the sample.
3. Record your finding on the data table provided.
4. Press a piece of adhesive tape onto the surface of the fabric to remove any additional evidence that the forceps/tweezers cannot pick up. Tape the evidence on white paper and examine it. Add any items to your data table.
5. Repeat steps 1 through 4 with your other two fabric squares.
6. Open the white sock sealed envelope in the same manner as you opened your fabric square bags.
7. Use the same procedure as you did for the fabric squares to examine the white sock.
8. You must determine which of the three original location matches the crime scene location.

Name _____ Date _____ Period _____

Data Table:

Fabric Square from Location #1	Fabric Square from Location #2	Fabric Square from Location #3	White Sock

Questions:

1. Based on your examination of the trace evidence, which of the three sites was probably the crime scene? Justify your answer!!
2. How might the adhesive tape interfere with your evidence collection?
3. Why were gloves necessary in the collection and handling of trace evidence?
4. What other instruments could be used to improve on your ability to identify evidence?

5. A suspect's shoes and clothing are confiscated and examined for trace evidence. What kind of evidence might be found on the clothes or shoes? List at least **five examples** of trace evidence from the shoes or clothing that might be useful in linking a suspect to a crime scene.

6. A home burglary has occurred. It appears the perpetrator entered after breaking a window. A metal safe had been opened by drilling through its tumblers. A suspect was seen running through the garden. Three suspects were interrogated and their clothing examined. List at least **three examples** of trace evidence that might be found on the suspect.

7. Some examples of trace evidence are listed below. For each item, suggest a possible location where the trace evidence might have originated. For example, broken glass fragments – headlight from a hit-and-run accident.

Trace Evidence	Possible Source
Example: glass fragment	Headlight from car accident
Sand	
Sawdust	
Pollen	
Makeup	
Hair	
Fibers	
Powders or residues	
Metal filings	
Oil or grease	
Gravel	
Insects	

