

SI Forensics - Full Discipline Demo

Trace Evidence

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Forensics - Full Discipline Demo
Course	SI Forensics - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Match each term with the best description.

Indirect transfer	Material passed from the perpetrator to the crime scene.	1
Locard's exchange principle	Items found at a crime scene or on a suspect that are very small.	2
Reverse transfer	Occurs when material moves straight from the material's source onto the object upon which it is discovered.	3
Direct transfer	Can be used to indicate an individual had recent contact with metal.	4
Trace evidence	Occurs when material moves from the material's original source to an intermediary object, and then from the intermediary to the object upon which it is discovered.	5
Transfer	States every individual is constantly depositing and picking up materials to and from the surrounding environment	6
Trace metal detection	Material passed from the crime scene to the perpetrator.	7

Correct answers:

- 1 Transfer 2 Trace evidence 3 Direct transfer
 4 Trace metal detection 5 Indirect transfer
 6 Locard's exchange principle 7 Reverse transfer

Classify each statement regarding trace metal detection as true or false.

⚡ Different types of metal cannot be differentiated using trace metal detection.

⚡ All trace metal detection fluids require visualization with UV light.

⚡
Trace metal detection can be used to differentiate between someone who only handled a gun and someone who fired a gun.

⚡
Trace metals can only be detected within a few hours of the contact between the skin and the metal.

⚡ Trace metal detection is used to determine where a gun was held against the body.

True

False

1

2

Correct answers:

1

Trace metal detection is used to determine where a gun was held against the body.

Trace metal detection can be used to differentiate between someone who only handled a gun and someone who fired a gun.

2

Trace metals can only be detected within a few hours of the contact between the skin and the metal.

Different types of metal cannot be differentiated using trace metal detection.

All trace metal detection fluids require visualization with UV light.

Exploration

Which of the following would not be classified as trace evidence?

- ☐ Hair
- ☒ A gun ✓
- ☐ Foreign soil
- ☐ Fingerprints

Which of the following would not be classified as trace evidence?

- ☐ Hair
- ☒ A gun ✓
- ☐ Foreign soil
- ☐ Fingerprints

Only someone who had recently held a gun would yield a positive result for a TMDT.

- ☐ True
- ☒ False ✓

Exercise 1

How many sources did the materials found on your clothing come from? Was the number of sources higher or lower than you expected?

Student answers will vary. Students will most likely find materials from at least two different sources.

Explain how you were able to determine exactly where some of the material found on your clothing came from.

Student answers will vary. Students should use their knowledge of what environments they came in contact with during the day to determine the source of the materials.

Why is it important to start with clean clothes when doing this experiment?

It is important to start with clean clothes because otherwise the clothing material could already contain embedded objects from a location not visited that day.

Data Table 1: Record of materials found on items of clothing
(SAMPLE ANSWER BELOW)

Item of Clothing	Material Recovered
Student data will vary, sample data provided. Sweater	Dog hair, human hair
Socks	Dog hair, thread, dirt
Jeans	Dog hair

Exercise 2

What differences did you observe with the trace metal detection test between the two hands?

Describe a situation where the trace metal detection test could be used in a criminal investigation.

What do you think the results would look like if you only held the metal pieces for a few seconds?

Photo 1: Left hand
(SAMPLE ANSWER BELOW)



Photo 2: Right hand
(SAMPLE ANSWER BELOW)



Competency Review

A perpetrator who leaves hair from his cat behind at the crime scene is an example of _____.

- ☐ Reverse transfer
- ☐ Direct transfer
- ☒ Indirect transfer ✓
- ☐ Inverse transfer

Locard's exchange principle concerns trace evidence.

- ☒ True ✓
- ☐ False

Trace metals can be detected on the skin up to _____ after contact with the metal.

- ☐ 1 hour
- ☐ 4 hours
- ☐ 24 hours
- ☒ 48 hours ✓

Trace metal detection solution utilizing 2-nitroso-1-naphthol yields an instant reaction when exposed to various metal ions without requiring visualization using UV light.

- ☒ True
- ☐ False

✓

Environment has no bearing on the trace evidence found on clothing.

- ☐ True
- ☒ False

✓

When examining an article of clothing for trace evidence, the garment should be shaken vigorously to release all of the trace evidence it contains.

- ☐ True
- ☒ False

✓

Metal ions transfer to skin more readily if moisture is present.

- ☒ True
- ☐ False

✓

Which of the following were you able to determine with the trace metal detection test used in Exercise 2?

- ☐ The type of metal
- ☐ The duration of contact between the metal and the skin
- ☒ The shape of the metal object held
- ☐ The color of the metal object held

✓

Extension Questions

Use what you know about trace evidence to explain why it is so important for crime scene investigators to utilize personal protective equipment such as gloves, hairnets, and booties. (SAMPLE ANSWER BELOW)

Personal protective equipment must be worn by crime scene investigators to prevent contamination of the crime scene. Locard's exchange principle states that every individual is constantly depositing materials to the surrounding environment. The use of personal protective equipment reduces the amount of transfer that may occur from the crime scene investigators to the crime scene, keeping it as pristine as possible.