

SI Forensics - Full Discipline Demo

Analysis of Soil

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

Classify each statement regarding soil evidence as true or false.

⚡ Soil samples found on items should be removed from the items at the crime scene.	
⚡ Rare minerals detected in a soil sample provide valuable clues.	
⚡ Soil found on cars must be carefully removed to preserve the order of layers.	
⚡ Processing for soil analysis is the last step of examining tool evidence.	
True	False
1	2

Correct answers:

1 Rare minerals detected in a soil sample provide valuable clues.

Soil found on cars must be carefully removed to preserve the order of layers.

2

Soil samples found on items should be removed from the items at the crime scene.

Processing for soil analysis is the last step of examining tool evidence.

Match each test to the quality of the soil it is used to identify.

⌘ Filtration through a series of sieves

⌘ Munsell color chart

⌘ Microscopy

⌘ Texture test

Color

Composition

Particle size ratio

Fractional weight of particles

1

2

3

4

Correct answers:

- 1 Munsell color chart 2 Microscopy 3 Texture test
4 Filtration through a series of sieves

Exploration

Soil is so unique based on location it is sometimes compared with fingerprints.

- ☒ True

☐ False
- ✓

_____ have diameters between 0.002 mm and 0.1 mm.

- ☐ Clays

☐ Sands

☒ Silts
- ✓

Which of the following is NOT a category in the Munsell color system?

- ☐ Chroma
- ☒ Shade
- ☐ Hue
- ☐ Value

Exercise 1

What were you able to conclude through your analysis of the soil samples? Does the suspect's story seem valid based on your results?

Why did this exercise have you perform so many different tests on the soil samples?

In this exercise, you were provided with a large amount of the shoe tread sample. How would your ability to perform these tests change with a more accurate amount of soil to what would be found in a shoe tread?

Data Table 1: Preliminary Analysis
(SAMPLE ANSWER BELOW)

Sample	Organic Materials	Munsell Color Values	Soil Texture
Garden	Pieces of bark present	2/4	Sandy loam
Burial Site	Pieces of bark present	2/2	Clay loam or silty clay loam

Shoe Tread	Pieces of bark present	2/4	Sandy loam
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Data Table 2: Particle Fraction Analysis
(SAMPLE ANSWER BELOW)

Sample	Particle Fraction 1 Mass (g)	Particle Fraction 2 Mass (g)	Particle Fraction 3 Mass (g)	Particle Fraction 4 Mass (g)
Garden	2.3	1.4	1.0	0.2
Burial Site	2.1	1.5	0.8	0.2
Shoe Tread	1.9	1.6	1.2	0.2

Data Table 3: Microscopic Analysis
(SAMPLE ANSWER BELOW)

Sample	Microscope Observations	Magnification of Photo
Garden	Larger grains of soil with a high amount of transparent grains present	60X
Burial Site	Fine grains of soil with few transparent grains present	60X
Shoe Tread	Larger grains of soil with a high amount of transparent grains present	60X

Photo 1: Garden Soil Sample
(SAMPLE ANSWER BELOW)

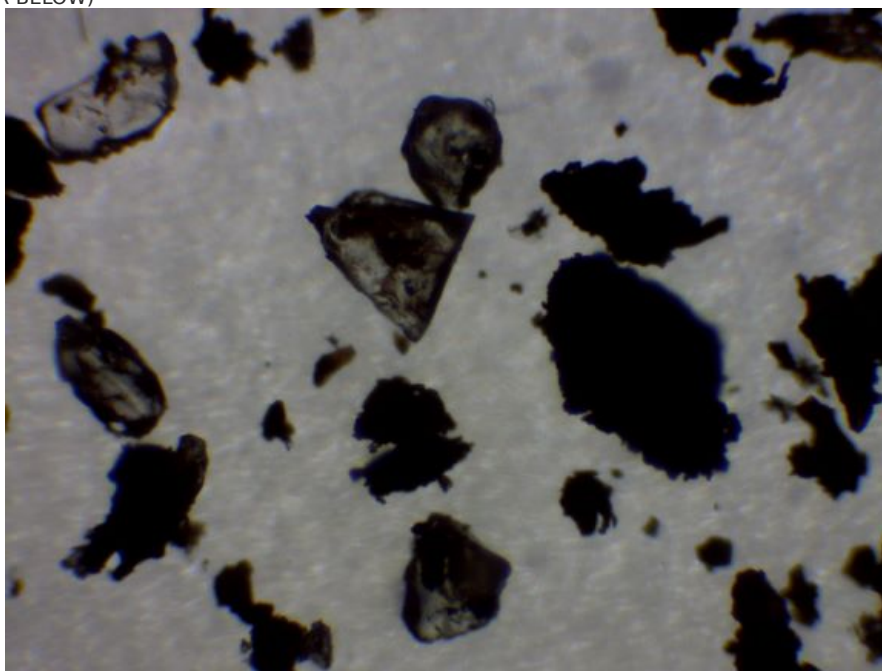


Photo 2: Burial Site Sample
(SAMPLE ANSWER BELOW)

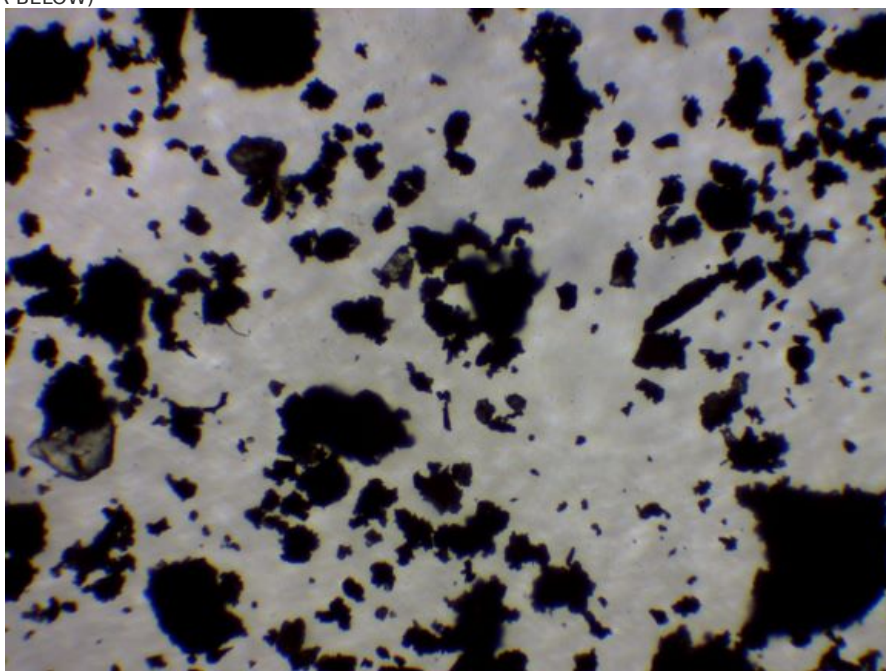
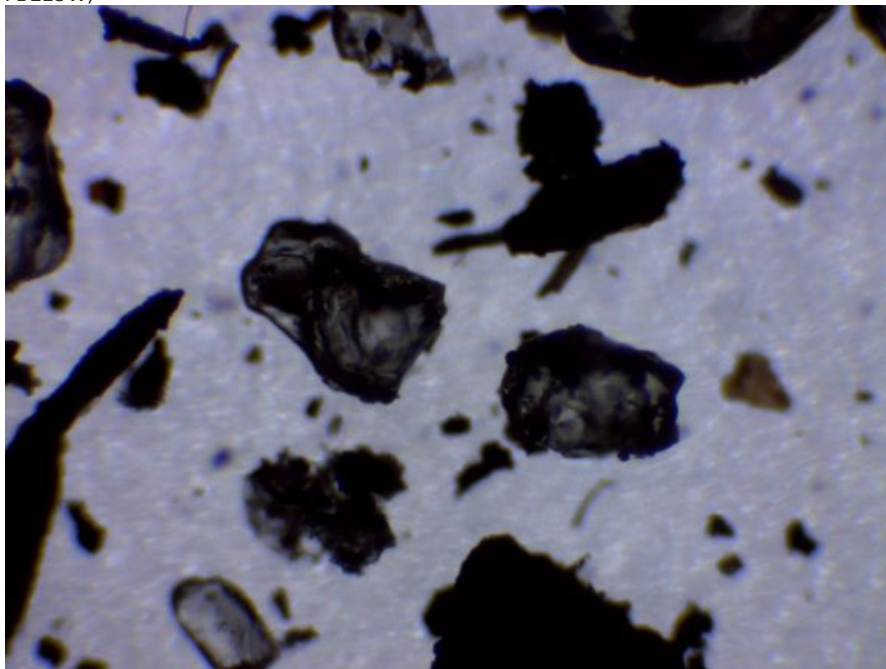


Photo 3: Shoe Tread Sample
(SAMPLE ANSWER BELOW)



Competency Review

Soil is usually found in very small quantities on suspects or victims.

- ☒ True ✓
- ☐ False

Forensic analysis of soil begins with microscopic examination.

- ☐ True
- ☒ False ✓

_____ are the smallest soil particles with diameters of 0.002 mm or less.

- ☒ Clays ✓
- ☐ Sands
- ☐ Silts

It is important to thoroughly dry all samples before analysis of any kind.

- ☒ True ✓
- ☐ False
-

A soil sample with a hue of 2YR, a value of 4, and a chroma of 6 would be written as _____.

- ☐ Hue: 2YR/Value: 4/Chroma: 6
 - ☒ 2YR 4/6 ✓
 - ☐ 2YR 6/4
 - ☐ YR 2/4/6
-

Which of the following is not a characteristic used to identify minerals through petrography?

- ☐ Refractive index
 - ☐ Color
 - ☐ Appearance under polarized light
 - ☒ Pollen type ✓
-

In Exercise 1, the source of which soil sample needed to be identified?

- ☐ Garden sample
 - ☐ Burial site sample
 - ☒ Shoe tread sample ✓
 - ☐ None of the above
-

In Exercise 1, water was added to the soil samples to determine their _____.

- ☐ color
 - ☒ texture ✓
 - ☐ particle fraction size
 - ☐ composition
-

Extension Questions

Imagine the following scenario: A body is found in an alleyway. Examination of the body reveals an obvious amount of fresh dirt packed under the fingernails.

Outline the steps that should be taken for proper forensic analysis of the soil sample found under the fingernails.

(SAMPLE ANSWER BELOW)

The soil must be scraped and collected from underneath the fingernails. Any soil samples found in the alleyway should also be collected. Both soil samples should be thoroughly dried. Then, each soil sample should be examined to determine the color and composition. The examination for composition may include examination both using a hand lens and a microscope. If there is enough soil recovered from under the fingernails, the soil may be analyzed for texture and particle fraction size, but it is unlikely enough soil will be present for these analyses. If the soil under the nails does not match the soil found in the alley, soil samples should be collected from any possible locations that turn up over the course of the investigation so those soil samples can be analyzed and compared to the sample taken from under the fingernails.