FORENSIC SOIL ANALYSIS LAB pdf

1: Soil Analysisâ€”Forensic Laboratory Kit

Forensic Soil Analysis is the use of soil sciences and other disciplines to aid in criminal investigation. Soils are like fingerprints because every type of soil that exists has unique properties that act as identification markers.

Grain of Evidence Solve the crime from the I-Detective show! Are you one of the top detectives? Do your best to solve the crime in the shortest amount of time. The teacher will collect your time and score! A high school locker was broken into during lunch and several valuable items were stolen. A bottle containing sand that had been collected while on vacation in Destin, Florida that summer, overturned and spilled onto the ground. A small trail of this sand led across the hall to the Child Development class who were in charge of the preschool that day. Obtain your sample from one of the shoes. Determine the size, color, transparency, and sorting of the sand grains. Your forensic lab has been sent a soil sample to determine if it came from one of three sites. It is your job to determine if it is from sample A, B, C or none of these areas. Do as much testing as necessary to make the determination. Write your findings below. Fleming, the high school principal, has come to our class with an interesting problem. He has accused another boy of knocking off his glasses and then stepping on them. After speaking with the boy, Dr. Fleming examined his shoes and removed a small piece of glass. Determine the density of the glass sample. A car backed into another car in the parking lot at school. Several different pieces of glass were found around the area. Determine by its refractive index whether the sample of glass you are given was from a headlight or is another type of glass. Determine the refractive index of the glass sample.

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2: Materials Testing Laboratory

Soil analysis is the process of determining what components make up a soil specimen, and in what proportions. Forensic scientists use microscopic examination and various physical and chemical tests to determine the characteristics of a questioned soil specimen (also known as an associated soil specimen, a suspect soil specimen, or an unknown.

How to transfer Credit Chemistry Forensic Science focuses on the application of scientific methods and techniques to crime and law. Recent advances in scientific methods and principles have had an enormous impact upon law enforcement and the entire criminal justice system. This course is intended to provide an introduction to understanding the science behind crime detection. Scientific methods specifically relevant to crime detection and analysis will be presented, with emphasis placed upon the techniques used in evaluating physical evidence. Topics included are blood analysis, organic and inorganic evidence analysis, microscopic investigations, hair analysis, DNA, drug chemistry and toxicology, fiber comparisons, paints, glass compositions and fragmentation, fingerprints, soil comparisons, and arson investigations, among others. Laboratory exercises will include learning techniques commonly employed in forensic investigations. Final grades will be assigned based upon tests, the comprehensive final examination, and the laboratory. The laboratory is available from Chemical Education Resources www. Definition and scope of forensic science, history and development of forensic science, the organization of a crime laboratory, services of the crime laboratory, the functions of the forensic scientist, other forensic science services. Processing the crime scene, legal considerations at the crime scene. Common types of physical evidence, the significance of physical evidence. The metric SI system, physical properties of glass and soil, comparing glass fragments, glass fractures, collection and preservation of glass evidence, forensic characterization of soil, collection and preservation of evidence. Elements and compounds, selecting an analytical technique, chromatography, spectrophotometry, mass spectrometry. Evidence in the assassination of President Kennedy, the emission spectrum of elements, atomic absorption spectrophotometry, the origin of emission and absorption spectra, neutron activation analysis, X-ray diffraction. The compound microscope, the comparison microscope, the stereoscopic microscope, the polarizing microscope, the microspectrophotometer, the scanning electron microscope SEM. Morphology of hair, identification and comparison of hair, collection of hair evidence, types of fibers, identification and comparison of man-made fibers, collection of fiber evidence, forensic examination of paint, collection and preservation of paint evidence. Drug dependence, narcotic drugs, hallucinogens, depressants, stimulants, anabolic steroids, drug-control laws, drug identification, collection and preservation of drug evidence. Toxicology of alcohol, the role of the toxicologist, techniques used in toxicology, the significance of toxicological findings, the drug recognition expert. The chemistry of fire, searching the fire scene, collection and preservation of arson evidence, analysis of flammable residues, types of explosives, collection and analysis of explosives. The nature of blood, forensic characterization of bloodstains, stain pattern of blood, principles of heredity, forensic characterization of semen, collection of rape evidence. History of fingerprinting, fundamental principles of fingerprints, classification of fingerprints, automated fingerprint identification systems, methods of detecting fingerprints, preservation of developed prints, digital imaging for fingerprint enhancement. Bullet comparisons, cartridge cases, automated firearm search systems, gunpowder residues, primer residues of the hands, serial number restoration, collection and preservation of firearm evidence, tool marks, other impressions. Handwriting comparisons, collection of handwriting exemplars, typewriting comparisons, photocopies, printer and Fax examination, alterations, erasures and obliterations, other document problems, voice examination. Forensic Science on the Internet: What is the Internet? Where to go on the Internet, exploring forensic science of the Web, websites to explore. Laboratory Experiments involve techniques frequently encountered in forensic investigations. These experiments include safety practices in the chemistry laboratory; separating and identifying food dyes by paper chromatography; identifying a solid by its density; classifying carbohydrates; enantiomeric purity of commercial ibuprofen; qualitative tests for amino acids and proteins; DNA extraction; nine bottles:

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3: Physical Evidence

Summary Students will attempt to solve a "cold case" crime based on evidence from the suspects and the crime scene in the form of soil samples.

Professional forensics labs use standard quantitative analysis laboratory techniques to test soil specimens for the presence and concentration of various inorganic and organic compounds. We were about to do the sameâ€”in fact, the original title of this laboratory session was Determine Soil Phosphate Concentration by Quantitative Analysisâ€—when we were struck by a cunning plan. In other words, these kits contain everything needed to perform a quantitative analysis of several aspects of soil chemistry. As it happens, all of those analytes are also useful for our forensic soil analysis. The Rapitest Soil Test Kit The kit contains four color-coded plastic test chambers, each with 10 color-coded capsules. To prepare the soil specimen, you soak it in five times its volume of water, allow it to settle, and then fill up a test chamber with the clear solution. You break one test capsule into the test chamber, allow it to react for 10 minutes and then compare the color to a transparent color chart right next to the reaction chamber. Required Equipment and Supplies goggles, gloves, and protective clothing foam cups 6, but see Substitutions and Modifications graduated cylinder, mL see Substitutions and Modifications wash bottle Rapitest Soil Test Kit see Substitutions and Modifications pH meter or pH test paper optional; see Substitutions and Modifications watch, clock or other timing device distilled or deionized water dry soil specimens, known and questioned All of the specialty lab equipment and chemicals needed for this and other lab sessions are available individually from the Maker Shed or other laboratory supplies vendors. Maker Shed also offers customized laboratory kits at special prices, and a wide selection of microscopes and microscope accessories. CAUTION None of the activities in this lab session present any real hazard, but as a matter of good practice you should always wear splash goggles, gloves, and protective clothing when working in the lab. Substitutions and Modifications You may substitute any similar size containers, such as beakers or drinking glasses, for the foam cups. The Rapitest Soil Test Kit requires soaking soil specimens in five times their volume of water, so choose your specimen and container sizes accordingly. Most similar kits have similar requirements. You may substitute a graduated beaker, small measuring cup, or similar graduated container for the graduated cylinder. Exact volumes are not critical. You may substitute any packaged soil test kit for the Rapitest If the test kit you buy does not include pH, or if you prefer to obtain a more accurate pH value, you can use standard pH test paper or a pH meter to obtain pH values. Procedure This lab has two parts. Part I â€” Determine concentration of nitrogen, phosphorus, and potassium ions The Rapitest Soil Testing Kit uses visual colorimetry to determine the concentrations of nitrogen, phosphorus, and potassium in soil specimens. The soil specimen is soaked in water to solubilize the nitrate, phosphate, and potassium ions. That solution is treated with solid reagents, supplied in capsule form, and allowed to react for 10 minutes, after which the color of each solution is compared against a standard color chart to determine the concentration of the ion being tested. If you use a different brand of soil test kit, modify these instructions accordingly as required. If you have not already done so, put on your splash goggles, gloves, and protective clothing. Label six foam cups Q1 and K1 through K5 for your questioned soil and five known soil specimens. Based on the capacity of your cups, decide how large a soil specimen to use. We used mL 6 ounce foam cups, and decided to use 20 mL of soil per cup. Use the graduated cylinder to measure the decided volume of the questioned soil specimen, and transfer that specimen to cup Q1. Use the graduated cylinder to measure fives times as much distilled water as the volume of soil you used and transfer the water to cup Q1. In our case, we added mL of water to our 20 mL soil specimen. Use the stirring rod to mix the soil and water thoroughly for at least one minute, and then set the cup aside to settle. Repeat steps 4 through 6 for each of the five known soil specimens, placing each in the corresponding labeled cup. Allow all six soil specimens to settle thoroughly. Depending on the characteristics of the soil specimens, this may take anything from a few minutes to 24 hours or more. Use the Beral pipette provided with the test kit to fill each of the three color-coded reaction chambersâ€—pink for nitrogen, blue for phosphorus, and orange for potassiumâ€—provided with the kit to the fill line with the clear solution from cup Q1. Carefully open one of

the pink capsules and add the contents to the nitrogen reaction chamber. Cap the chamber and shake it until the solid reagent is completely dissolved. Repeat step 10 using the blue phosphorus chamber and capsule and the orange potassium chamber and capsule. After allowing the reaction in each chamber to proceed for 10 minutes, compare the color of the solution against the standard color scale on the reaction chamber, as shown in Figure Use open shade daylight, but not direct sunlight to do the comparison. Interpolate the values as closely as possible. For example, if the color in the potassium chamber appears to be almost-but-not-quite halfway between the values on the comparison chart for 2 and 3, you might record the observed value for potassium as 2. Record the values you observe for nitrogen, phosphorus, and potassium concentrations for specimen Q1 in the corresponding column of Table Empty each reaction chamber and rinse it thoroughly. Repeat steps 9 through 13 for each of the known soil specimens, K1 through K5. Reading the results of a phosphorus test The soil specimen test shown in Figure showed a phosphorus concentration between P1 Deficient and P2 Adequate. We judged the intensity of the color to be about midway between those reference points, and so recorded the phosphorus test results for this specimen as 1. Chemical characteristics of soil â€" observed data Item.

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4: Forensics Lab Soil Analysis - Introduction | Make: DIY Projects and Ideas for Makers

In the Soil Analysis Forensics Laboratory Kit, examine soils microscopically, conduct pH and phosphate tests and then collect data from a soil density profile demonstration.

Consultation and Special Projects Optical Microscopy Services Two decades of experience in the analysis of air, bulk material, water, and particulate samples by phase contrast microscopy and polarized light microscopy, have provided Forensic Analytical Laboratories with the depth and level of experience required by many clients. Fiberglass is determined using the same method and counting rules B. PLM is applicable to the analysis of building survey submissions and other bulk materials. Particle Identification Services Particle identification and trace particle analysis projects are performed on an unlimited variety of materials. The primary tools used for particle identification are optical microscopy and scanning electron microscopy. Particle identification is useful for comparisons of specific particles, determination of sources of particles, percent of respirable particles, product evaluations and forensic investigations. Particles can be sized and characterized by elemental composition and the distribution of sizes documented. Gravimetry Gravimetry, which quantitatively removes organic and acid-soluble binder components typically found in building materials by ashing and acid-washing samples, is an ideal preparation technique when low level asbestos concentrations need to be determined. Once the gravimetric weight loss is established, the sample residue can be analyzed by PLM visual estimate or point counting or TEM. This technique can achieve detection limits down to 0. Electron Microscopy Services The analysis of mineral fibers and particulate by scanning electron microscopy SEM and transmission electron microscopy TEM provide absolute mineral identification and low method sensitivity. AHERA and Yamate Analyses A variety of analytical protocols are available for determining the concentrations of asbestos fibers in air samples. The AHERA protocol is the industry standard for clearance sample analysis and is mandatory for primary and secondary schools in the U. The protocol calls for the collection and submission of sets of 13 samples, the counting of fibers and structures greater than or equal to 0. The Yamate protocols, while similar in sample preparation techniques, count all structures with aspect ratios greater than 3 to 1. Special sampling containers and sampling instructions are provided to clients. The TEM laboratory is accredited by the State of California for the analysis of asbestos in drinking water and wastewater. Bulk Material Analyses Building materials including floor tiles and roofing tars and dust samples are analyzed by TEM. Analyses may be qualitative, semi-quantitative or quantitative and involve a variety of sample preparation techniques including gravimetry. Consultation and Special Projects A wide range of experience and training provides a team of microscopy experts who are available to supplement investigative teams in the field of forensics, geochemistry, product identification, particle sizing and size distribution, and contamination sources. Recent projects include studies to analyze dusts for various inorganic materials and pharmaceutical products for asbestos.

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5: Welcome | Forensic DNA Profiling Facility

Forensic soil analysis is the use of sciences In an actual forensics laboratory, soil samples are further dried at Â° C for IYS Soils Activity.

Soil Transference Patterns on Bras: Image Processing and Laboratory Dragging Experiments. What is forensic soil analysis? Forensic soil analysis is used by forensic soil experts and police forensic investigators to provide evidence to help police solve crime. In major crimes with no fingerprint or DNA evidence or reliable witness testimony, soil evidence can help police target their enquiries towards a particular suspect or location. Soil evidence can be even more valuable when it enhances other supporting evidence. Trace soil evidence is often overlooked by criminals trying to remove all evidence of their crime. Forensic soil scientists use different methods to analyse this soil evidence including visual analysis, light microscopy, Scanning Electron Microscopy and X-Ray Diffraction analysis. How was it applied in this study? The current approach to analyzing forensic soil evidence is to focus on profiling the chemistry of the soil to indicate a possible origin. Instead, soil evidence is generally ignored until specific items are chosen for analysis by either police forensic investigators or forensic soil experts. This soil analysis begins once as much soil as possible is rigorously removed from clothing fabric. This removal may involve shaking soil particles from clothing into collection bags or even cutting out sections of soiled material. The aim of this research was to test whether soil patterns on fabric could provide police with a reliable method to interpret trace soil pattern evidence on clothing. During my research some papers yet to be published , two methods of soil transfer have been tested; namely placing or dragging a simulated clothed human victim across a soil surface. All soil samples underwent XRD analysis to test whether soil chemistry and mineralogy had influenced the resulting soil patterns on clothing fabric. Soil evidence was analyzed for Munsell soil color using both a traditional naked eye technique and a new method I developed involving image processing analysis of digital photos of trace soil evidence on clothing. Trimble eCognition Developer image processing software was programmed to recognize a limited palette of 25 Munsell soil colors. Digital photographs of soil evidence on white clothing fabric was then analyzed to ascertain whether image processing software had the potential to offer police a more objective and accurate method of analyzing Munsell soil color than naked eye visual analysis and a cheaper, quicker and more accessible method than spectrophotometry. Why was it so important for this case? This research was instigated by a high-profile unsolved murder case from Western Australia. Because of the lack of published papers that offered a scientific interpretation of trace soil patterns on clothing, the judge could not accept the police interpretation of what happened to the victim during or after the attack, beyond reasonable doubt. Soil is comparable to a human fingerprint in its uniqueness. Soil will never be as uniquely individual as the patterns formed by ridgelines on a human fingerprint. Even identical twins have different fingerprint patterns. However, natural soil types are created from combinations of different parent rocks and organic materials, which undergo a large variety of geological and climatic processes to produce soil. The resulting soil will be relatively unique when compared with soil from different locations. Human-altered or human-transported soil will often contain a combination of minerals or human-made items such as glass or plastic particles not normally found together in a natural environment. Describe your role in the study. Until this research was undertaken, there was no scientific method accepted in a court of law to interpret trace soil marks on items of clothing evidence. For my PhD project, I designed a series of soil transfer experiments, run both in the laboratory and field, to simulate a clothed human body either placed or dragged across a soil surface. After initially running experiments in the laboratory, I tested whether the trace soil marks identified under controlled laboratory conditions could also be documented under realistic conditions in the field. In this second series of experiment in a paper soon to be published , a human rescue dummy dressed in a clean padded bra was dragged across different soil surfaces in the Royal Tasmanian Botanical Gardens in Hobart, Tasmania. How did you choose which types of soils to use in the study? Natural and human-made or human-altered Tasmanian soil samples were used in this study; to increase scientific understanding of how trace soil evidence that had originated from local soil sites would appear on different common clothing fabrics. Although only

one fabric types was investigated in this paper [Murray et al. The bras were dragged across the soil surface for three seconds. How did you determine this to be the appropriate amount of time? Three seconds was chosen as the optimum dragging time because of the dimensions of the glass Pyrex dish used in laboratory experiments. Each bra was secured to a weight and manually dragged in a straight line across the dish, using a drag line. To provide consistent and reproducible results, it was important that a continual dragging movement was achieved without any stopping or starting. Cross-section of weighted bra dragged from right to left over soil material during a three second count soil transference experiment. Sections of bra that are not subjected to being dragged over the soil during the experiment remain clean inside a cliplock plastic bag on top of the weight. Note the end of the glass Pyrex dish containing soil material and weighted bra is placed on a nonslip mat and a backstop of weights on the left to stop it moving during the transference experiment. What was unique about the soil transfer patterns? During a series of soil transfer experiments, it was discovered that certain transfer patterns indicated whether soil had been transferred onto weighted clothing fabric either by dragging or placing a clothed victim on a soil surface. It was also discovered that soil marks could indicate whether soil was wet or dry at the time it was transferred. Knowing the moisture content of trace soil might help police to narrow the time slot in which the crime was committed. Or in the event that a body was moved to a second location and the first crime scene location was not known, forensic investigators may be able to use meteorological records to focus their search on geographical areas with similar weather conditions. Soil trails on fabric, aligned with direction of movement right to left. The dramatic difference that can occur when soil from the same soil sample is transferred during a dry run a and wet run b is shown using natural soil sample Notice also the massive build-up of soil over the raised middle seam and the minimal amount of soil transferred directly behind it. Does it become more difficult to detect patterns if the fabric is colored? This research was the first time image processing software was used to examine trace soil evidence on clothing fabric. To make this task easier, white fabric was chosen to provide a visual contrast to the color of all soils tested and thereby make it easier to identify microscope traces of soil particles transferred to clothing fabric. Because soil comes in such a variety of colors, a more accurate method of detecting minute quantities of soil on multi-colored or patterned fabric will need to be developed to be of practical use to forensic investigators. One method to achieve this might be to programme image processing software to first identify clean sections of different clothing fabric textures. This might entail taking a digital photograph of a clean section of an item of clothing evidence. How were the Munsell charts used? Munsell soil color charts are routinely used in the field by soil scientists to determine soil color. In fact, Munsell soil color charts are used routinely by forensic soil scientists and geologists in the field and laboratory in most forensic investigations involving soil as evidence. As a consequence, Munsell soil colors have been used to help solve several major crime investigations such as when soil color, together with X-ray diffraction analyses, played a major role to solve a double murder case in South Australia see Table 3 in Fitzpatrick and Raven Image processing software was also programmed to recognize the dominant range of Munsell colors from digital photographs of trace amounts of soil transferred to clothing fabric. Although other color systems exist, as a forensic soil scientist, I prefer the simple and direct visual method soil color analysis the Munsell color systems provides. Because this system of soil color analysis is globally recognized, adopting this method enabled the results of this research to be understandable and relevant to forensic soil scientists and forensic investigators worldwide. Why was the image processing analysis so important and how was it utilized in conjunction with the Munsell charts? Image processing analysis was important in this study because every human retina is relatively unique and therefore soil color is not interpreted in exactly the same way by every soil scientist. It was hoped that image processing software could be programmed to provide a reliable and accessible method of objectively and accurately determining the Munsell soil color of trace amounts of soil evidence on clothing fabric. Although spectrophotometers have been designed to fulfill this purpose, they are not always accessible to forensic scientists analyzing soil evidence at crime scenes or in the laboratory. Image processing analysis also enabled a range of dominant Munsell soil colors to be identified for microscopic traces of soil evidence on clothing fabric. When image processing software was programmed to recognize a limited palette of Munsell soil colors, this resulted in dominant color peaks; reminiscent of mineralogical peaks seen in XRD analyses of soil

evidence. When this numerical data was graphed in a rose diagram, this provided a strong indication of whether soil had been transferred to clothing fabric by placing or dragging a clothed body on a soil surface. Munsell Soil Colour Range of Soil Transferred to Fabric in Pixels Munsell soil colour range recognised by image processing software of soil from the Rose garden path Munsell soil colour range recognised by image processing software of soil from the Rose garden path How can this study be used at a crime scene? By taking digital photographs of soil evidence on a simulated clothed body under artificial lighting in a laboratory and natural lighting in the field, it was hoped image processing software could be programmed to adjust for different lighting conditions in order to identify trace soil evidence on clothing fabric, and specific characteristics such as soil color, using this photographic evidence alone. Most trace soil patterns could easily be identified by naked eye. However, digital photographs provided a pristine record of this soil evidence for further analysis. For forensic laboratories facing a massive backlog of soil evidence waiting to be analysed, or police in developing nations who do not have access to expensive XRD machines, spectrophotometers or trained personnel required to interpret forensic soil results, pre-programmed image processing software may enable quick in-house testing of forensic soil evidence. Strong uni-modal directionality was produced when fabric was dragged from right to left across the soil surface. Dry soil particles had a greater tendency than wet soil to gather against the middle seam, creating more of a bi-modal directionality. How can evidence like this be used in a court of law? The concept of conducting and interpreting soil transference experiments on clothing for a specific purpose, as published in our SFI journal paper, provided the catalyst and confidence for my co-author Professor Rob Fitzpatrick to design and conduct a new series of specific soil transference experiments in regard to a cold murder case in South Australia. The results of his soil transference experiments, which involved conducting laboratory transference shaking experiments with clean strips of pajama-top fabric, used Scanning Electron Microscopy to verify that the mineral particles were dominantly on the surface of the pajama fabric. Whereas, in the questioned pajama-top swatches, the particles were deeply impregnated in gaps between fibres of the fabric; which likely originated under water with force being applied on the pajama top. This information, together with other soil mineralogical data, was used by Professor Rob Fitzpatrick as evidence in the South Australian Supreme Court. Was there anything about the results of the study that surprised you? When I was first asked to design a method for interpreting trace soil evidence on clothing as evidence of the circumstances of an attack, it was not known whether trace soil patterns could be identified, let alone reliably reproduced. Once I had successfully identified sets of trace soil patterns under laboratory conditions that could be used to establish that a clothed victim had been dragged across a soil surface, it was not known whether these same patterns could be identified in the field using a clothed human rescue dummy. The results of this second set of experiments are soon to be published. I was pleasantly surprised when the same trace soil patterns were also recognized on clothing fabric in the field. A new set of trace soil patterns were also documented when the human rescue dummy was only placed on soil and not dragged across it. This was the strongest indication that this new method of forensic soil analysis could be used by forensic soil scientists to help police solve crime. Are there any plans to further the study by looking at other soil types? I have one paper soon to be published and another two papers submitted for publication. These final two papers broaden my research to include a larger variety of soil types from across Tasmania. I currently do not have funding to continue my research in this new field of forensic soil analysis. Do you feel that this study will extend well beyond this case in being able to help solve other crimes? My research has shown trace soil patterns can be used to interpret the method of soil transfer to clothing and therefore the circumstances befalling a victim during or after an attack.

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6: Forensic Analytical Laboratories, Inc.

Forensic Soil Evidence Smart criminals are well-aware that they need to hide their fingerprints when committing a crime. Some are even adept at trying to destroy DNA evidence from a crime scene.

Soil is one of the most common forms of physical evidence found at crime scenes. For example, a vehicle suspected of having been used in an armed robbery may later be found to have soil from the crime scene adhering to its tires or wheel wells, thereby establishing that that vehicle was present at the scene. Similarly, a suspected rapist or mugger may have soil adhering to clothing or shoes. Soil specimens are often particularly easy to obtain from shoes or boots with deep tread, as shown in Figure Rubber-soled shoes or boots with deep treads are likely sources for soil specimens Dennis Hilliard comments Footwear and tire impressions in soil are an excellent example of examining different types of class evidence to increase certainty. The questioned impressions can be compared against impressions made by known footwear or tires to determine if they are consistent. In addition, the soil found adhering to the footwear or tires can be compared against soil from the scene to determine if they are consistent. If both types of class evidence are consistent, that increases the likelihood that the suspect person or vehicle was in fact present at the scene. Obviously, impression evidence must be preserved before soil specimens are taken. Depending on the nature of the impressions and the underlying surface, impressions may be preserved by photographing them or by making casts. Soil evidence by itself is seldom sufficient to secure a conviction, because it usually establishes only that a suspected person or object was present at the crime scene at some time, but not when that visit took place. Equally, soil evidence can be exculpatory. For example, the police may suspect someone who has mud stains on his clothing that appear visually to be consistent with the soil at the crime scene. If subsequent forensic tests establish that the mud stains on the clothing are inconsistent with the soil at the scene, the police can redirect their efforts elsewhere. But how can forensic scientists determine whether one soil specimen is consistent with another? After all, dirt is dirt, right? Soil is a complex mixture of mineral, vegetable, and animal material, and may also contain plastic, glass, metal, and other manufactured materials. Soil is anything but uniform. Specimens taken only a few centimeters apart may differ significantly in composition. Two specimens taken at a distance from each other, even if they are of the same general type, are almost certain to have sufficient differences in their composition, physical properties, and chemical properties to make it possible to discriminate between them. These differences mean that soil from any particular location has its own unique fingerprint. Soil analysis is the process of determining what components make up a soil specimen, and in what proportions. Forensic scientists use microscopic examination and various physical and chemical tests to determine the characteristics of a questioned soil specimen also known as an associated soil specimen, a suspect soil specimen, or an unknown soil specimen. By performing the same tests on a known soil specimen, a forensic scientist can, if the specimens are consistent in all respects, state with high certainty that the two specimens in fact originated from the same location. A forensic geologist has primary responsibility for forensic soil analysis. Tests done by the forensic geologist are often sufficient to identify soil specimens as consistent. At times, however, a forensic geologist will call upon other specialists to complete more detailed analyses. For example, a forensic entomologist may be needed to identify insect eggs or larvae present in the soil specimen, a forensic botanist to identify pollen or other plant material present in the specimen, or a forensic chemist to identify trace amounts of organic or inorganic chemicals present in the specimen.

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7: TeachersFirst - Who Did It? - TeachersFirst Introduces Forensic Science - Soil Analysis Lab Handout

A forensic soil geologist in a laboratory is responsible for the technical analysis of soil evidence that is collected at a crime scene and brought to a laboratory for detailed examination.

Yellow Crime Scene Tape 9. Density-Gradient Tube Anticipatory Set: Journal entry or warm-up question: Set up crime scene - "Someone broke into the school building last night and raided the student lockers. The only evidence found was a shoe print and some dirt in the hallway. Complete anticipatory set as described above. Hand out lecture notes and lecture. Hand out lab notes. Explain lab to students. Have students complete the lab according to the directions. Hand out homework assignment. Using a "Koosh" or other type of ball, everyone must name one new thing they learned from the lecture. On a piece of paper, students will list three "contaminate" items they could find in a soil sample. Learning support or lower ability students may be provided with lecture notes that have fewer blank spaces to fill in. Gifted students may be provided with lecture notes that have many blacks or they may have to take notes on their own. The lab does not need to be adapted because the cooperative groups are mixed ability. Students will conduct a lab that will reinforce the lecture information. Students will have a homework assignment that uses information obtained from the lab. Students will be evaluated by their lab handout and homework. Students will be evaluated by the final unit project. The lesson will also be evaluated at the end of the unit.

8: Forensic Science - Mrs. Bradbury's Webpage

Forensic Geologists study evidence relating to minerals, soil, petroleums, and other materials found in the Earth used to answer questions raised by the.

9: Forensic Science -

Forensic soil analysis is used by forensic soil experts and police forensic investigators to provide evidence to help police solve crime. In major crimes with no fingerprint or DNA evidence or reliable witness testimony, soil evidence can help police target their enquiries towards a particular suspect or location.

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Israel without the Bible Gary A. Rendsburg First continental congress worksheet Politics of the welfare state Cloud Computing Explained Proceedings 2002 First International IEEE Symposium Intelligent Systems Irelands management of EU business : the impact of Nice Brigid Laffan Management and practices of pig rearing Cbest math study guide Peaceful coexistence: multiuser issues Sams Christmas Angel International Trade in Professional Services An introduction to computer software Suggested charter for an International trade organization of the United nations . Writing as Political and Creative Expression September 13, 1993 the fateful day Reel 8. Item 37 thru item 40 Introductory econometrics for finance 3rd edition brooks Dehydration update on research and literature cohfe research on dehydration. Drm software for Manual of otology Idiographic approaches to measuring change and influencing outcomes Movements and lunar phenomena Germs (Great Medical Discoveries) Catholicism: Roman and Anglican Burning of Monterey Surfactants in Personal Care Products and Decorative Cosmetics, Third Edition (Surfactant Science) Italian Cooking Encyclopedia Programming the finite element method 5th edition The image in form Jawbone up 3 manual V. 2. Mechanisms, modelling and future developments. Program development in java liskov Using 1-2-3 release 3.4 The life and works of John Heywood Invasion, by R. Podolny. Fired Up. Not Burnt Out The reign of terror (Nov. 1939) Teaching with WAC: a redesigned act in distributed learning Victoria: A Love Is Born Telling untold stories