

Tools in Forensic Science

– Student Notes

Directions:

Fill in the blanks.

Evidence Collection Tools Segment

1. Tools in Forensic Science

- Are used to:
 - _____ evidence from a crime scene
 - analyze evidence in forensic science labs
 - store and _____ evidence

2. Evidence Collection Tools

- Include equipment used to secure the crime scene such as:
 - crime scene _____ tape
 - personal protective equipment
 - evidence _____
 - crime scene lights
 - crime scene documentation

3. Barricade Tape

- Is _____ tape used to mark off crime scene areas
- Is used to keep _____ individuals from entering the crime scene and potentially harming evidence

4. Personal Protective Equipment

- Provides a barrier to keep _____ or chemical hazards from contacting the skin or eyes
- Prevents _____ of the crime scene

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5. Personal Protective Equipment

- Includes:
 - disposable gloves
 - masks
 - booties
 - hair _____
 - hair _____
 - hats
 - overalls
 - eye protection
 - glasses
 - goggles

6. Evidence Markers

- Are numbered or lettered markers placed next to each piece of evidence at the crime scene
- Are used to keep organized _____ records of evidence when photographing
- Include markers in the form of:
 - small _____ tents
 - cones
 - flat L-shaped pieces of plastic
 - flags
 - adhesive number sheets

7. Crime Scene Lighting

- Is used when searching crime scenes in dimly lit places or at night
- Includes light sources such as:
 - flashlights
 - glow _____
 - tall standing lights
 - evidence marker _____
 - small lights placed under evidence cones or tents for easy visibility

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8. Crime Scene Documentation Tools

- Are used to _____ as many details as possible regarding the crime scene and evidence
- Includes items such as:
 - notebooks and _____ utensils
 - cameras

9. Notebooks & Writing Utensils

- Are used to take handwritten notes
 - notetaking should begin immediately when arriving on a crime scene
- Should be used to record information such as:
 - date and time
 - victim and witness _____
 - general description of the scene
 - crime scene sketches
 - evidence _____ of custody

10. Cameras

- Are handled devices used to record _____ images
- Are used to record:
 - the crime scene before evidence is _____
 - evidence found at the crime scene

11. Cameras

- Includes:
 - photography:
 - still images useful for _____ evidence found at the crime scene to possible suspect evidence
 - used to take pictures of objects with rulers to show actual size
 - video cameras
 - moving _____ images
 - shows the structure of the crime scene

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12. Evidence Collection Tools

- Are used to collect evidence from a crime scene
- Include:
 - scalpels
 - forceps, _____ and needle nose pliers
 - vacuum cleaners with special filters
 - tape
 - combs
 - brushes
 - _____ powders
 - magnifying glass

13. Evidence Collection Tools

- Include:
 - sterile _____ swabs
 - UV light
 - smear slides
 - scissors
 - shovel
 - sifting screen
 - metal _____
 - molds

14. Scalpels

- Are knives with a _____ flat blade at the end of a handle
- Are used to collect evidence at crime scenes by:
 - scraping objects from flat _____
 - cutting around objects containing evidence

15. Scalpels

- Are used to collect evidence including:
 - _____ evidence
 - bodily fluids
- Should be used with caution because of the _____ tip
- Should be sterile before use

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16. Forceps, Tweezers & Needle Nose Pliers

- Are tools consisting of two _____ with small pointed ends which are pressed together to pick small pieces of evidence off an object
- Are used to collect evidence such as
 - trace evidence
 - _____ evidence
- Should be sterile before use

17. Vacuum Cleaners With Special Filters

- Use filter traps to collect very small evidence
- Are used to pick up several items at once
- Consists of _____ filters which are placed in evidence bags and _____ to forensic science labs

18. Vacuum Cleaners With Special Filters

- Should be used to _____ possible evidence in areas such as:
 - _____ cushions
 - carpets
 - car interiors

19. Tape

- Is plastic _____ strips used to lift evidence from an object
- Should be pressed down on the surface containing evidence and lifted to immediately be placed on a backing card
 - prevents _____ items sticking to tape with evidence samples

20. Tape

- Is used to collect evidence such as:
 - _____ evidence
 - ballistics
 - bodily fluids
 - fingerprints
- Should be used _____ gloves

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21. Combs

- Are flat strips of _____ teeth used collect evidence from a persons hair including foreign objects deposited by an assailant such as:
 - hair
 - dandruff
 - fibers
 - DNA
 - _____ fluids

22. Brushes

- Are _____ of hair or wire set in bundles
- Are used to:
 - clean or _____ off evidence
 - gently remove dirt from around a buried object
 - gently apply powder on surfaces to identify fingerprints
 - transfer trace evidence samples

23. Fingerprint Powders

- Are very fine, dry _____ used to find latent fingerprints by dusting over objects with brushes
- _____ to moisture found in latent prints and illuminate them making them visible

24. Magnifying Glass

- Is a _____ lens set in a frame which produces an enlarged image of an object when looked through
- Is used in crime scene investigation to find _____ pieces of evidence

25. Sterile Cloth Swabs

- Are small pieces of _____ material attached at the end of a stick
- Are pressed or _____ against an object containing evidence to collect it
- Are used to collect evidence including:
 - trace evidence
 - bodily fluids
 - ballistic evidence

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26. UV Light

- Is an invisible form of _____ radiation which carries more energy than regular light
- Helps _____ fluids not visible to the naked eye by creating a fluorescent illumination

Fluorescent: strikingly bright, vivid or glowing

27. Smear Slides

- Are flat rectangular pieces of glass used to hold evidence
- Secures evidence with a plastic slip over the top
- Should be _____
- Can be used to collect evidence such as:
 - hair
 - bodily fluids
 - trace evidence
- Should be handled _____ gloves

28. Scissors

- Are a cutting instrument consisting of two _____ and a ring shaped handle which pivots and cuts against the other
- Are used to cut out pieces of an object containing bodily fluid samples or _____ residue without damaging the sample

29. Shovel

- Is a _____ instrument with a broad blade or scoop at the end of a handle
- Is used to _____ evidence which has been buried

30. Sifting Screen

- Is a _____ screen set in a frame
- Is used to _____ evidence from dirt

31. Metal Detectors

- Are _____ devices used to detect metal objects by sweeping the device over an object or the ground
- Are used to locate evidence containing _____ which has been hidden or buried

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32. Molds

- Are _____ frames which hold a particular shape
- Are used to collect impression evidence such as:
 - footprints
 - _____ tracks

33. Molds

- Include:
 - 3-D
 - a _____ is poured into the impression, hardened and then removed, providing a cast of the print
 - 2-D
 - an _____ strip is placed over the impression left at the crime scene and lifted off to create a 2-D print of the pattern

Evidence Analysis Tools Segment

1. Evidence Analysis Tools

- Include:
 - microscopes
 - macrophotography
 - gel _____ apparatuses
 - gas chromatographers
 - spectrosopes
 - mass spectrometers
 - toxicology
 - _____ metal deposition
 - x-ray machines

2. Evidence Analysis Tools

- Includes:
 - trajectory _____ software
 - computer software
 - _____ tools
 - hot plates
 - prepared slides
 - stereoscopes
 - micropipettes

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3. Microscopes

- Are optical _____ used for viewing very small objects
- Include types such as:
 - stereomicroscope
 - compound microscope
 - _____ light microscope
 - comparison microscope
 - scanning electron microscopes

4. Stereomicroscopes

- Are a _____ microscope which provides a relatively low-power view of the subject
- Feature a set of optics for each eye which provide views at slightly different _____ producing a 3-D visualization
- Are used to:
 - study the surface of solid specimens
 - magnify objects during dissection or surgery

5. Compound Microscopes

- Are microscopes with a _____ lens systems and an eyepiece, mounted in a tube which produces very high magnification
- Consist of a rotary lens piece used for adjusting magnification
- Are used to:
 - analyze _____
 - analyze cells and tissue

6. Polarized Light Microscopes

- Produce a _____ light source focused on the item
- Are designed to observe and photograph specimens which are visible primarily due to their optically anisotropic character
- Consists of:
 - polarizer
 - positioned in the light path
 - analyzer
 - positioned in the _____ pathway

Anisotropic: exhibiting properties with different values when measured in differed directions

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7. Comparison Microscopes

- Are used to compare items _____
- Consist of two compound microscopes which display both items at once
- Avoid the _____ having to rely on memory when comparing two objects
- Are used to study known samples against evidence collected at a crime scene

8. Scanning Electron Microscopes

- Are high resolution microscopes which allows _____ items to be viewed in great detail
- Use a _____ of electrons reflected on an object to form an image
- Allow more of a item to be focused on at a time

9. Macrophotography

- Is extreme _____ photography used to document very small pieces of evidence
- Captures photos with emphasis on detail which can help forensic scientists analyze evidence such as:
 - victim or suspect's hair left on an object
 - small _____ of drugs found at the crime scene
 - tool marks on a keyhole used in forced entry
- Requires special lens and camera settings

10. Gel Electrophoresis Apparatuses

- Places _____ samples in a gel and uses negative and positive charges to separate DNA molecules according to size
- Allows forensic scientists to analyze DNA structures
 - genetic _____ within cells

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11. Gas Chromatographers

- Are used to _____ various elements of a compound by observing how they react with a specific solvent
 - once the components are separated they can be easily analyzed
- Are used to identify:
 - alcohol or drug use at time of death
 - _____ found at the crime scene which can be traced to a different location or suspect
 - chemicals used to set a fire

12. Spectroscopes

- Are used to measure the intensity of light _____ or emitted by particular substances allowing forensic scientist to identify the substance
- Are used to analyze:
 - bodily fluids
 - _____ remains
 - fingerprints
 - drugs
 - chemicals

13. Mass Spectrometers

- Are used to _____ a sample to determine its molecular makeup
- Allows a sciences to separate a sample into individual ions in order to determine the samples composition
- Are used to analyze extremely small pieces of evidence such as:
 - trace evidence
 - _____ evidence
- Are used to perform toxicology analysis

14. Toxicology

- Is the study of chemical agents _____ on living organisms
- Analyzes bodily fluids for the presence of:
 - drug use
 - _____ substances

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15. Vacuum Metal Deposition

- Is a technique used to _____ latent prints by coating evidence with a thin layer of evaporated metal film under a high vacuum
- Is used to develop prints which are _____ or found on porous surfaces

16. X-Ray Machines

- Are used to _____ or create a digital image of the internal composition of a person or object
- Are used to analyze internal evidence such as:
 - bullets
 - broken bones
 - bruising
 - _____ from weapons used to harm a person

17. Trajectory Analysis Software

- Uses _____ and observation to reconstruct how a shooting most likely occurred to determine the location of the _____

18. Computer Software

- Are programs used to store information and create _____ science databases to easily identify:
 - fingerprints
 - DNA profiles
 - _____ evidence
 - the identity of a criminal through facial recognition
 - footprints left at a crime scene

19. Measurement Tools

- Include:
 - _____ measurement tools
 - thermometer
 - _____ devices
 - scales
 - calculators
 - lab glassware

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20. Length Measurement Tools

- Are used to:
 - measure area of a crime scene to make proportional crime scene sketches
 - measure various types of evidence such as:
 - shoeprints
 - gunshot _____
 - blood spatter
 - bones of a deceased person to determine height
- Include tools such as:
 - meter sticks
 - _____ measure
 - measuring wheel

21. Meter Stick

- Is a measuring stick one meter in _____ which is marked in inches, centimeters and millimeters
- Is used for measuring the length of small flat pieces of _____ such as:
 - shoeprints
 - documents
 - handprints

22. Tape Measure

- Is a _____ strip of cloth or steel tape marked in inches or centimeters
- Is used for measuring:
 - area of a crime scene
 - large pieces of evidence
 - odd shaped evidence
 - _____ tape measure can be wrapped around objects

23. Measuring Wheel

- _____ records distance by pushing the wheel around an area or large object
- Is used to record the _____ of the area of a crime scene

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24. Thermometers

- Are used to measure temperature of:
 - bodies
 - liquids
 - chemicals
 - gasses
 - environment
 - objects
- Are used to:
 - determine how long a body has been _____ at a crime scene
 - temperature of chemicals to perform forensic science analysis in labs
 - _____ at a crime scene

25. Timing Devices

- Are used to measure time
- Are used to perform time _____ chemical reaction tests
- Include:
 - _____ and timers
 - clocks

26. Scales

- Include:
 - _____ balance scales
 - moisture analyzers
 - precision scales
 - _____ beam balance scales
 - ABFO scales

27. Analytical Balance Scales

- Are used to measure _____ with extreme sensitivity
- Consist of a small weight enclosed in a box with a door to ensure dust or air currents do not _____ the reading

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28. Moisture Analyzers

- Are used to measure _____ content in an object
- Weighs the sample before and after heat is used to evaporate moisture from the sample to determine the weight lost in drying
- Are used to determine moisture levels in:
 - pharmaceuticals
 - chemicals
 - _____ samples
 - food

29. Precision Scales

- Are used for _____ measurements for exact weights
- Are used to _____ various lab samples

30. Triple Beam Balance Scales

- Are scales _____ of three beams with a sliding weight in the middle which balances the weight horizontally
- Consist of a pan at one end in which the object is placed
- Are used for very _____ measurements of mass material

31. ABFO Scales

- Are American Board of Forensic Odontology scales
 - _____ measuring device used in photography
- Are scales used to measure length rather than weight
- Are used to photograph measurements of evidence such as:
 - blood spatter
 - bite-marks
 - bruises
 - _____ prints

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32. Calculators

- Are used to:
 - collect and _____ data
 - analyze statistics to discover patterns
 - _____ measurements of evidence
- Can be used to perform mathematical equation to determine:
 - angles at which the various blood stains struck their respective surfaces
 - trajectory analysis
 - calculate the height of a person based on the size of a bone

33. Lab Glassware

- Are glass containers used to store _____ or powders for:
 - measuring
 - heating
 - cooling
 - transferring _____
 - mixing
 - pouring

34. Lab Glassware

- Includes:
 - beakers
 - jars
 - _____
 - tubes
 - cylinders
 - droppers
 - funnels
 - pipettes
 - vials
 - _____ dish

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35. Hot Plates

- Are a flat heated surface used to:
 - heat _____
 - perform chemical _____
- Should be used with heat resistant glassware and heat protective gripping devices

36. Prepared Slides

- Are flat rectangular pieces of glass which items are placed upon to be viewed under a _____
- Hold evidence with a plastic slip over the top
- Should be labeled
- Can display evidence such as:
 - hair
 - bodily fluids
 - trace evidence
- Should be handled wearing _____

37. Stereoscopes

- Are devices by which two photographs of the same object are taken at slightly _____ angles are viewed together, creating an impression of _____

38. Micropipettes

- Are a fine _____ pipette with a plunger used to measure and transfer small amounts of liquids
- Are used by placing the pointed pipette end into the liquid sample and pressing down on the plunger to draw the liquid into the pipette

Pipette: a _____ tube attached to a bulb used to transfer or measure out small quantities of liquid

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Evidence Preservation Tools Segment

1. Evidence Storing & Preservation Tools

- Include:
 - _____packaging
 - freezers and refrigerators
 - storage cabinets
 - lab _____
 - evidence drying cabinets

2. Evidence Packaging

- Includes _____packaging evidence depending on its type
- Includes:
 - bags
 - boxes
 - envelopes
 - containers
- Should always contain a _____of custody form

3. Freezers & Refrigerators

- Are used for _____term preservation of evidence
- Should maintain temperature for integrity
 - temperature depends on type of evidence
- Are used to store evidence such as:
 - DNA
 - biological specimens
 - bones
 - teeth
- Should be closely _____to ensure consistent temperature

4. Storage Cabinets

- Are shelves used for storage typically placed in an _____room or warehouse
- Are used for _____safe storage of evidence

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5. Lab Incubators

- Provide a controlled, _____ environment for storage of cell cultures
 - cells _____ under a controlled condition
- Regulates conditions such as:
 - temperature
 - humidity
 - carbon dioxide

6. Evidence Drying Cabinets

- Are _____ cabinets designed to store, dry or process forensic evidence in a controlled environment
- Prevent cross contamination
 - prevents lab personnel from exposure to _____
 - protects evidence from exposure to lab chemicals