



2016 - 2017 Academic Junior High Decathlon

**Science Super Quiz Study Guide**

**Answer Keys**



2017 Super Quiz Science: *DK Eyewitness: Forensics*  
Vocabulary Answer Key

**In Pursuit of the Criminal**

forensic science - the use of scientific methods and knowledge to investigate crime (6)

forum - Latin word meaning to present and interpret scientific information in court (6)

entomology - the study of insects (6)

forensic pathologist - a scientist who determines the cause of death and if there is evidence of a crime (7)

acquittal - a judgment that a person is not guilty of a crime with which the person has been charged (7)

prosecution - legal proceedings against a person charged with a crime (7)

**The Birth of Forensics**

toxicology - the study of drugs and poisons (8)

calipers - an instrument used to take measurements of physical dimensions (8-9)

Bertillonage - the earliest scientific system for identifying people by their physical appearance (9)

mugshot - photographs taken of a known criminal, usually consisting of a frontal and side view (9)

**Securing the Scene**

search pattern - an organized method of searching a crime scene (11)

**Recording the Scene**

Locard's Exchange Principle - "Every contact leaves a trace." (12)

static plate - metal plates that criminal investigators lay down and step on to prevent contamination of evidence on the ground at a crime scene (13)

marker card - numbered or lettered cards used to catalogue and identify pieces of evidence at the scene of a crime (13)

dental stone - a type of liquid that hardens when it dries; used to make casts of footprints and other markings on the ground at a crime scene (13)

cleansuit - outfit worn by forensic investigators at a crime scene, designed to prevent contamination (12)

### **Handling of Evidence**

chain of custody - tracking of evidence from a crime scene to court to ensure that it remains the same as when it was first found (15)

scalpel - a disposable knife (15)

protractor - a ruler that measures angles (15)

pipette - a slender tube attached to a suction bulb, used for transferring or measuring out small quantities of liquid, especially in a laboratory (15)

### **Taking Fingerprints**

latent print - a print that is invisible to the naked eye (16)

patent print - a print that is visible to the naked eye (16)

lifting tape - clear adhesive tape used to lift fingerprints from a surface (16)

magnetic wand - a device used with magnetic powder to dust for fingerprints (17)

### **Analyzing Fingerprints**

linen tester - a type of magnifying glass (18)

whorl - fingerprint in which the ridges near the center of the pattern form closed curves (19)

loop - fingerprint in which the each ridge enters and leaves on the left or right side of the finger (19)

arch - fingerprint in which each ridge enters and leaves on opposite sides (19)

Galton details - tiny features that appear on the ridges of fingerprints (19)

super-glue fuming - a method of finding fingerprints on an object by placing it in a cabinet with heated glue that adheres to the fingerprint pattern (19)

2017 Super Quiz Science: *DK Eyewitness: Forensics*  
Vocabulary Answer Key

**Written in Blood**

Kastle-Meyer test - a chemical test to determine if a stain is blood (20)

presumptive test - a test performed on evidence at a crime scene (20)

reagent - a substance or compound added to a system to cause a chemical reaction, or added to see if a reaction occurs (20)

phenolphthalein - a chemical reagent used in a Kastle-Meyer test (20)

**DNA Analysis**

DNA - deoxyribonucleic acid; a substance that carries the unique genetic code of an organism (22)

PCR - polymerase chain reaction; a method of duplicating fragments of DNA for the purpose of providing a large enough sample for DNA profiling (23)

electrophoresis machine - a machine used to separating molecules in a substance according to their size and electrical charge to determine the make-up of the substance (23)

amplify - to increase by making copies (23)

STR - short tandem repeats; DNA markers used in DNA profiling (23)

DNA profile - representation of DNA markers in graph form (23)

**Trace Evidence**

trace evidence - small objects or amounts of substances that can be used as evidence (24)

SEM - scanning electron microscope; a microscope that uses a beam of electrons instead of light to magnify an image (25)

comparison microscope - a double microscope used to compare two similar items (24)

**Natural Clues**

pollen - a powdery substance produced by the male reproductive part of a plant that is carried to other plants to fertilize ovules for the production of seeds (26)

FTIR - Fourier transform infrared spectroscopy; a machine which uses visible and infrared light to analyze trace evidence (27)

### **A Good Impression**

resin - liquid plastic (29)

### **Guns and Bullets**

FDR - firearm discharge residue; microscopic powder from the explosive charge in a cartridge that is sprayed onto the hand of a person firing a gun (30)

GSR - gunshot residue; microscopic powder from the explosive charge in a cartridge that is sprayed onto the hand of a person firing a gun (30)

rifle - a long-barreled firearm that has spiral grooves running along the inside of its barrel (30)

rifling - spiral grooves along the inside of a rifle barrel that makes a bullet fly in a straighter path when it is fired (30)

pistol – handgun (30)

semiautomatic - a gun that with a single pull of the trigger fires the bullet, ejects the used cartridge, and readies the next cartridge for firing (30)

trigger - the firing mechanism of a gun or bomb (30)

automatic - a gun that will fire repeated shots while the trigger is pressed once and held (30)

shotgun - a long-barreled firearm that fires many small pellets (shot) enclosed in a shell, rather than a single bullet (31)

cartridge - a cylinder containing the explosive charge and the bullet or pellets for a gun (31)

dum-dum - a bullet that is altered to do more damage when it hits a target (31)

### **Firearms in the Laboratory**

ballistics - the study of guns, bullets, and trajectories; the science of the flight of projectiles (32)

internal ballistics - the study of the processes involved as the bullet is fired and travels down the barrel (32)

terminal ballistics - the study of what happens when a fired bullet strikes a target (32)

trajectory - the path followed by a flying projectile (33)

### **At the Scene of the Crime**

cadaver dogs - dogs trained to scent a dead body (34)

infrared heat detectors - a machine that detects heat emitted from an object or body (34)

decomposition - the state or process of rotting; decay (35)

GPR - ground-penetrating radar; a geophysical method that uses radar pulses to image underground surface (35)

### **A Bug's Life**

cadaverine - a foul-smelling compound produced by the decomposition of animal tissue (36)

putrescine - a colorless compound with a foul odor that is produced in decaying animal matter (36)

larvae - a stage in insect development just before metamorphosis into the adult stage (36)

pupa - an insect in its inactive immature form between larva and adult; a chrysalis (37)

maggot - a soft-bodied legless larva especially that of a fly found in decaying matter (37)

### **Cause of Death**

postmortem - after death (38)

autopsy - the medical examination of a corpse to determine the cause of death (38)

suffocation - the process in which death is caused by impairing respiration (stop from breathing) (38)

mortuary - a storage room for dead bodies; morgue (39)

hemorrhage - a profuse discharge of blood, especially from a ruptured blood vessel (39)

### **Toxic World**

toxin - any substance that is harmful or poisonous to the human body (40)

stimulant - any drug or substance that increases the activity of the brain and central nervous system (40)

mass spectrometer - a machine used to measure and identify very small amounts of substances (41)

### **The Bones of the Matter**

forensic anthropology - the study of skeletal remains for identification (42)

CT - computer tomography; a method of scanning a body in sections to create a 3-dimensional image of its parts (43)

### **Splitting Image**

CCTV - closed-circuit television; a television camera surveillance system in which broadcasting signals are not publicly distributed but are monitored, primarily for surveillance and security purposes (44)

identikit - photo identification system made up of photos of facial features on strips of cards (44)

forensic phonetician - a scientist who studies speech patterns (45)

voiceprint - a graphic representation of a person's speech patterns (45)

E-FIT - a computerized version of the photographic identification system (45)

### **Behavior of the Offender**

profiler - a scientist who studies criminal behavior (46)

geographical profiling - a study of the locations and timing of a series of crimes (46)

psychological profiling - a study of a criminal's personality and history (46)

polygraph - lie detector machine; a machine that measures changes in physiology to detect whether a person is lying (47)

### **Fire Starters**

arson - deliberately starting a fire to cause damage or with criminal intent (48)

flammability - the ability of a substance to burn or ignite, causing fire or combustion (48)

flashover - the point during a fire at which everything flammable surrounding the fire reach a temperature that causes it to catch fire without being in contact with the main fire (48)

rollover - the point in a fire at which snakes of flame begin to separate from the main fire (48)

Dräger tube - a device used for analyzing gas samples at the scene of a fire (48)

2017 Super Quiz Science: *DK Eyewitness: Forensics*  
Vocabulary Answer Key

**Fire Testing**

smoke density chamber - a machine that tests the amount of smoke a substance produces when burned (50)

cone calorimeter - a machine that tests the amount of heat energy contained in a material (50)

accelerant - a highly flammable substance that can be used to start or increase the spread of a fire (50)

oxygen index apparatus - a machine that measures the flammability of a material (51)

**Crash Investigation**

black box - an event recorder installed in planes, ships, and trains that hold instrument and voice recordings to be reviewed in the case of a crash (52)

CVR - Cockpit Voice Recorder; a tape recorder that records the conversations of the flight crew (52)

FDR - Flight Data Recorder; a machine that records data from an airplane's instruments (52)

**The Big Bang**

sniffer dog - a dog trained to detect explosives, drugs, missing people or cadavers (54)

detonating device - a small explosive device used to initiate the chemical reaction of a high explosive or secondary explosive in a bomb (54)



2017 Super Quiz Science: *DK Eyewitness: Forensics*  
Vocabulary Answer Key

**Computer Forensics**

cybercrime - crime conducted on the internet or over a computer network (56)

hacker - a person who uses computers to gain unauthorized access to data (56)

relay mast - a piece of equipment used in cellular systems that boosts the strength of the cell signal for transmission (56)

MTSO - Mobile Telephone Switching Office; equipment that controls the routing of cellular phone calls to different cell towers (56)

smart card - a microchip embedded in a credit or debit card that encrypts data, carries information about the cardholder's identity and finances (57)

PIN - personal identification number; a code used to access information from encrypted private accounts (57)

virus - a malicious computer software program (57)

**Paper Trail**

forgery - the unlawful act of counterfeiting a document or object for the purposes of fraud or deception (58)

ESDA - Electrostatic Detection Apparatus; a device that uses static electricity and toner to reveal handwriting impressions on paper (59)

holographic strip - an anti-forgery feature on currency that uses pattern which, when suitably illuminated, produces a three-dimensional image (58)

watermark - a faint pattern or mark made in some types of paper during its production that can only be seen if it is held against the light (58)

**Every Picture Tells a Story**

radiocarbon dating - a test to determine the age of an object by measuring the amount of certain forms of carbon in it (61)

TL - thermoluminescence; a method of dating objects, chiefly pottery, by measuring the radiation given off by ceramic materials as they are heated (61)

### **Future Forensics**

fMRI - functional magnetic resonance imaging; a technique using magnetic resonance imaging for measuring brain activity by mapping changes in blood flow to certain parts of the brain during particular mental processes (62)

RFID - radio frequency identification device; a type of tracking device inserted under the skin (62)

biometric measurements - measurements of physical characteristics (62)

### **Glossary**

anthropometry - a series of body measurements used to identify a criminal (70)

chromatography - a series of lab tests that separate out the components of a mixture; in forensics, a test used to detect drugs or poison (70)

comparator - a device that enlarges and projects images of two different fingerprints to aid in comparison (70)

homicide - the act of killing an individual (71)

luminol - a chemical spray used to reveal traces of blood (71)

odontology - forensic dentistry; making identification from bite marks or matching a corpse's teeth to dental records (71)

paramedic - a person trained to administer emergency medical treatment (71)

pattern evidence - evidence that is significant for its shape or pattern (71)

post mortem interval - the estimated time since death (71)

precipitin test - a test used to distinguish human from animal blood (71)

provenance - a record of an object's history, including its origin and all of its owners (71)

rigor mortis - the stiffness of a corpse that occurs some hours after death (71)

serology - the study of blood and other body fluids (71)

suspect - a person who may be involved in a crime, but not been formally charged with a crime (71)

toolmark - mark on a surface that allows investigators to determine the type of or specific tool used (to perpetrate a crime) (71)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### In Pursuit of the Criminal

1. What is forensic science? the use of scientific methods to investigate crime (6)
2. What is the Latin root for the word *forensic*? forum (6)
3. What is the definition of the word *forensic*? presenting and interpreting scientific information in court (6)
4. What areas of scientific study may be used in forensic science? chemistry, engineering, entomology, computer science, pathology, and many other areas (6)
5. What is entomology? the study of insects (6)
6. What government agency maintains an extensive database on gun information? the FBI (6)
7. What is the purpose of conducting an autopsy? to find out the cause of death and if there are signs that a crime was committed in the death (7)
8. Who performs autopsies? a forensic pathologist (7)
9. Who is the real-life forensic scientist, college professor, and author upon which the fictional character of Temperance Brennan is based? Kathy Reichs (7)
10. What is the job of a forensic scientist when testifying at a criminal trial? to provide testimony on evidence

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### The Birth of Forensics

1. When were the use of scientific knowledge and the systematic study of evidence adopted to improve criminal investigation methods? during the 17<sup>th</sup> century (8)
2. Who invented one of the first lie detectors? Cesare Lombroso (8)
3. What is toxicology? the study of poisons (8)
4. Who is considered the father of forensic toxicology? Mathieu Orfila (8)
5. Who wrote *The Criminal Man*, a book that showed facial types of criminals? Cesare Lombroso (8)
6. What was the Bertillon system or Bertillonage? an early system of identifying people through the use of body measurements (8 – 9)
7. Who invented the Bertillonage system? Alphonse Bertillon (9)
8. When were the first fictional detective stories published? during the 19<sup>th</sup> century (8)
9. Photographs of crime suspects, used to identify a person by his or her physical appearance, are called mugshots. (9)
10. What instruments were used to take Bertillon measurements? calipers (8 – 9)
11. During what year did the Federal Bureau of Investigation (FBI) open its first forensic laboratory? 1932
12. When did Sir Arthur Conan Doyle first publish his detective stories about Sherlock Holmes? 1887

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Securing the Scene

1. What do forensic investigators use to record evidence at a crime scene? photographs, sketches, notes, measurements, statements, methods of collecting and labelling evidence (10)
2. Why is speed important in crime scene investigations? physical evidence may be altered by weather conditions and time; witnesses' memories of the event may not be as accurate after the passage of time (10)
3. The window of time during which a crime scene remains preserved is called the golden hour. (10)
4. What are the priorities of the police when called to the scene of a crime? (10)
  - a) Make sure no one is in danger.
  - b) Get help for anyone who is injured.
  - c) Secure the area of the crime.
5. Who may cross a police line? only authorized police officers and crime scene investigators (10)
6. Who must certify that the victim is dead before a body may be removed from a crime scene? a certified medical examiner (11)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Recording the Scene

1. When investigating a crime scene, what do forensic investigators wear to prevent trace evidence from contaminating the crime scene? clean suits, hood, face mask, gloves, and overshoes (12 - 13)
2. Why do forensic investigators wear protective gear? To avoid contaminating evidence and to protect themselves from poison and infectious diseases at the crime scene (12)
3. How are footprints preserved as evidence? Casts are made of the imprints. (13)
4. Why do forensic investigators take measurements and draw sketches of the crime scene? to document the position of objects and the distance between them, to show details not visible in photographs (12)
5. Who first coined the phrase “Every contact leaves a trace”? Edmond Locard (12)
6. What is written on the soles of the overshoes investigators wear at a crime scene? “POLICE” in mirror image (12)
7. What does a forensic photographer often include in photographs of a crime scene? marker cards placed next to each piece of evidence, a scale to show the size of objects (13)
8. Before a body may be removed from a crime scene, what must investigators do? outline the body in chalk and photograph it extensively from different angles (13)
9. What do forensic investigators use to avoid disturbing the ground at a crime scene? They stand on static plates. (13)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Handling the Evidence

1. List some of the items found in a typical evidence case or toolkit: fingerprint forms, labels, fingerprint brushes, vials, roller, digital thermometer, measuring scales, magnifying glass, tweezers, protractor, fingerprint powders, disposable rulers, swabs, latex gloves, measuring tape, scalpel, hazard tape, pipettes, evident bags, adhesive tape, scissors (14 – 15)
2. What items in an evidence case are used to collect fingerprint evidence? Fingerprint powder, fingerprint brushes, lifting tape, roller, fingerprint forms, and latex gloves (14 – 15)
3. Why is evidence recorded with digital photography sometimes challenged in court? Digital photography is easy to alter. (14)
4. What type of cameras are used to record crime scenes? film cameras (14)
5. What is a progress-of-custody label? a label placed on an evidence container that is signed by any person who handles the evidence to show the chain of custody (14 - 15)
6. Why is evidence placed in evidence bags before it is removed from a crime scene? to prevent the evidence from contamination, to ensure no one tampers with the evidence, to keep track of the evidence, and to keep track of the chain of custody of the evidence (15)
7. Are all evidence bags made out of plastic bags? No. Several different types of evidence bags and containers are used to secure evidence. (15)
8. What does a protractor measure? angles (15)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Taking Fingerprints

1. The police force of what country was the first to collect and store fingerprints to identify criminals? Argentina (16)
2. A fingerprint that is visible to the naked eye is called a patent print. (16)
3. A fingerprint that is not visible to the naked eye is called a latent print. (16)
4. Why do investigators take fingerprints from every individual present at a crime scene? to use as a comparison against the prints of suspects (16)
5. What basic tool is used to get a better view of small evidence? a magnifying glass (16)
6. What factors determine the type of brush used for lifting fingerprints? the size of the area, the type of fingerprint powder, and access to the area being dusted for prints (16)
7. Dark fingerprint powder is usually composed of carbon. (16 – 17)
8. Light powder is usually composed of chalk, titanium dioxide, or other materials. (16)
9. What tool is used to smooth lifting tape onto a dusted print to remove air bubbles and optimize contact of the tape with the fingerprint dust? a fingerprint roller (17)
10. When magnetic powder is used for fingerprinting, what type of tool is used to dust the fingerprint? a magnetic wand (17)



## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Analyzing Fingerprints

1. A linen tester is a type of magnifying glass. (18)
2. Who first published a study on fingerprints, showing that everyone has unique fingerprints and fingerprints do not change? Francis Galton (18)
3. Who was the first official in India to require a fingerprint to be affixed to contracts? Sir William Herschel (18)
4. What are the three most common fingerprint patterns? whorls, loops, and arches (19)
5. What is the most common type of fingerprint pattern? loops
6. What are Galton details? tiny differences that appear on the ridges of fingerprints (19)
7. What are some of the different Galton details that are used in comparing fingerprints? ridge ending, bifurcation, lake, independent ridge, dot or island, spur, and crossover (19)
8. What is used in a forensic lab to make fingerprints more visible on an object? fumes from heating up glue and laser light (19)
9. What machine is used to compare fingerprints side-by-side? a comparator (19)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Written in Blood

1. What test shows if a stain at a crime scene is blood? Kastle-Meyer test (20)
2. Who invented a chemical laboratory test to determine whether blood evidence is human or animal? Paul Uhlenhuth (20)
3. Who determined that humans have different blood types? Karl Landsteiner (20)
4. What are the four main blood groups of humans? A, B, O, and AB (20)
5. Who was the first person to develop a classification system for bloodstains based on their shape? John Glaister (20)
6. What are the six different bloodstain categories? drops, splashes, pools, spurts, smears, and trails (21)
7. What clues may the shape of bloodstains give to investigators? the type of weapon used in the assault, the location of the crime, if the victim was moved, and possible clues left by the assailant (21)
8. In a Kastle-Meyer test, what color does the paper turn if the stain being tested is blood? bright pink (21)
9. A bloodstain shows impact splatter when it has fallen from a height. (21)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### DNA Analysis

1. DNA is an acronym for deoxyribonucleic acid. (22)
2. What is carried in DNA? genetic code (22)
3. What is another name for DNA typing? DNA fingerprinting (22)
4. Who were the two scientists who discovered the double-helix structure of DNA?  
Francis Crick and James Watson (22)
5. Who invented DNA typing? Sir Alec Jeffreys (22)
6. What lab process increases the amount of DNA from evidence available for testing?  
amplification (23)
7. How can two individuals possess the same DNA fingerprint? Multiples (identical twins, triplets, etc.) share the same DNA. (23)
8. PCR is an acronym for polymerase chain reaction. (23)
9. STR is an acronym for short tandem repeats. (23)
10. How is DNA fingerprinting used to prosecute crimes involving the illegal smuggling of protected animals? DNA fingerprinting can determine if the remains of an animal are from an endangered species and the country of origin of the smuggled animal. (23)
11. Can DNA fingerprinting determine if two individuals are related? Yes, if the two individuals are closely related (siblings or offspring). (23)
12. DNA fingerprinting can produce graphs that are unique to a specific individual. The process used to produce DNA profile graphs is called electrophoresis. (23)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Trace Evidence

1. What is the exchange principle? Every contact leaves a trace. (24)
2. What technology is used to compare trace evidence? comparison and electron microscopes (24)
3. What is an electron? a small, negatively charged particle found inside an atom (24)
4. What is an SEM? scanning electron microscope (25)
5. What are the advantages in using an SEM instead of an optical microscope for analyzing forensic evidence? The SEM can reveal details that are not visible with an optical microscope and produces a 3-dimensional image of the evidence. (24-25)
6. What is formed in an SEM when the electrons are electrically charged and separate from their atoms? a stream of electrons form an electric current (25)
7. What must be done to a piece of evidence before it may be viewed with a scanning electron microscope? It must be plated with metal. (25)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Natural Clues

1. What is often found in dust? flakes of human and animal skin, dust mites, fibers, pollen, soil, hairs (26)
2. How does the study of fibers contribute to solving crimes? A comparison of fibers removed from a crime scene and fibers collected from a suspect may provide evidence that a suspect was at the scene of the crime. (26)
3. What are some features of hair that forensic scientists consider when comparing samples? hair color, type, length, condition, and residue from hair-care products (26)
4. What does the presence of pollen on the clothing of a victim or suspect tell a forensic scientist? It can tell when and where a crime may have been committed. (26)
5. What 1942 murder case was solved with information from grass seeds found on the suspect? the murder of Louise Almodovar by her husband, Anibal (27)
6. What is typically used to collect loose fibers from the scene of a crime? adhesive tape (27)
7. Who wrote *Treatise on Criminalistics*? Edmond Locard (27)
8. What is an FTIR? Fourier transform infrared spectroscopy (27)
9. What may be determined from an FTIR graph? the possible identification of fibers and other trace evidence (27)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### A Good Impression

1. What are some types of impressions that may serve as evidence? footprints, dents, and scrapes, tire tracks (28)
2. How may a forensic scientist determine the model and make of a shoe from a footprint? by comparing the size and pattern of the sole to a database listing information on shoe brands (28)
3. How may a forensic scientist determine if a tire tread comes from a specific car? by comparing the imprint of a tire tread with the wear patterns on the car's tires (28)
4. What clues do tools leave that may aid in the investigation of a crime? possible fingerprints of the criminal, unique marks made by the tool, fragments from the tool, trace evidence from the crime scene (28)
5. How does an investigator make a record of a footprint in dust? The investigator uses a foil-backed film that is electrified to attract the dust and form a copy of the footprint on the film. (28)
6. What type of image is made when the impression of a footprint or tire tread is filled with resin? a negative image (29)
7. What is made from the first cast made of an impression? a second cast in hard material that gives a positive image of the tread (29)
8. What is measured and recorded for footprints? the dimensions of the heel and sole, the tread of the sole, and any wear marks (29)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Guns and Bullets

1. When a gun is discovered at the scene of a crime, what is the first priority of the investigating officers? to secure or make safe any guns and ammunition that are present at the scene (30)
2. What information about the gun do investigators record at the crime scene? the position of the weapon, the damage to objects and humans caused by bullets, the location of bullet casings, the actual bullets, the position of the gunman, the trajectory of the bullets, and gunshot residue (30)
3. What is a bullet trajectory? the path a bullet travels when fired (30)
4. What is FDR and GSR? firearm discharge residue or gunshot residue, tiny particles that are produced when a gun is fired (30)
5. What was Operation Trident? a program of England's Metropolitan Police that allowed weapons to be turned in to the police without fear of prosecution for crimes linked to the firearm (30)
6. Who shot and killed President John F. Kennedy? Lee Harvey Oswald (31)
7. What is a semiautomatic handgun? A handgun that fires a bullet with a single pull of the trigger, then automatically ejects the used bullet cartridge and loads the next bullet into the chamber for firing (30)
8. Fill in the chart comparing different types of guns: (30-31)

Type of gun	Parts of gun	Type of ammunition	Accuracy
shotgun	long, smooth barrel, may have one or two barrels	fires shot - small pellets with wide dispersal pattern	less accurate than rifle, accurate at close range
rifle	long, spiral-grooved barrel, scope (sometimes)	long bullet, magazine clip	very accurate, particularly with telescopic sight
Handgun or pistol	short-barreled, semiautomatic or automatic loading	shorter bullet	accurate at close range

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

9. What is a fully automatic gun? A gun that can fire repeated shots while the trigger is pressed once and held down (30)
10. What is the official sidearm of the U.S. military? the Beretta 92FS (30)
11. What is another name for a modified bullet? a dum-dum bullet (31)
12. What does the hammer of the gun strike to ignite the gunpowder in the bullet cartridge? the primer or metal head (31)
13. What is the difference between a shotgun shell and a rifle cartridge? A shotgun shell is made of a plastic case with a metal head that is filled with small pellets. A rifle cartridge has a single bullet at the top and a metal case filled with gunpowder with a primer at the bottom of the cartridge. (31)



## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Firearms in the Laboratory

1. What is the word for the study of gun use? ballistics (32)
2. What is the term for the study of the processes involved as a bullet is fired and travels down the barrel of the gun? internal ballistics (32)
3. What is the term for the study of what happens when a bullet strikes a target? terminal ballistics (32)
4. What elements are found in firearm discharge residue? barium, antimony, and lead (32)
5. In a forensic lab, how is a gun fired safely? Guns are fired into a shooting tub filled with water. ( 32)
6. How do investigators determine if a specific gun was used at a crime scene? by comparing markings on a bullet from the crime scene to markings on a bullet fired from a gun in the lab (33)
7. What parts of the gun leave markings on a fired bullet? bullets are marked when forced into the chamber, when the hammer strikes the bullet, and by the rifling as it travels through a barrel (33)
8. What do investigators use to trace the trajectory of a bullet? rods, strings, or laser beams (33)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### At the Scene of the Crime

1. What type of crime employs the use of sniffer dogs? missing person cases, murder cases, bomb attacks, and searches for drugs (34)
2. Dogs that are specially trained to find dead bodies are called cadaver dogs. (34)
3. Why are helicopters not used more often in searches? It is very expensive to use helicopters. (34)
4. In what circumstances would a police search include a helicopter search? if wide areas need to be searched, if the terrain to be searched is too rugged for land vehicles to access, or if infrared heat detectors or other devices capable of detecting human bodies is required for the search (34)
5. What type of equipment aids divers in underwater searches? sonar equipment (35)
6. The United States maintains a research facility that studies the decomposition of bodies. What is the name of the research center? the Body Farm (35)
7. What information is gained from research into the decomposition of bodies? It provides information that helps to pinpoint the time of death. (35)
8. What is GPR? ground-penetrating radar (35)
9. How does GPR create images of objects buried underground? It emits high-frequency radio waves that reflect off of objects buried in the ground. (35)
10. Who was convicted of a crime based upon research conducted at the Body Farm? "Big Mike" Rubenstein, of murdering three of his relatives (35)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### A Bug's Life

1. What attract flies to a dead body? A cadaver releases substances, such as cadaverine or putrescine that attracts flies. (36)
2. What bug is the first to find a dead body? flies, including blowflies (36 – 37)
3. Most insects lay their eggs on dead bodies and open wounds to provide a food source for their young. (36)
4. What is the name of young insects when they emerge from the egg? larvae (36)
5. What does a forensic entomologist study? the life cycle of insects, to determine the approximate time of death of a corpse (36)
6. Why are ants often found around dead bodies? The ants eat on the larvae and maggots laid by other insects. (36)
7. What insect may mislead forensic scientists because it arrives at a corpse soon after blowflies to eat eggs and maggots? mites (36)
8. What do wasps feed on that attracts them to corpses? the other insects that are attracted to the corpse (36)
9. How long does it take for blowfly eggs to develop into maggots? approximately 24 hours after the eggs are laid (37)
10. How long after the eggs are laid does the maggot stage of a blowfly life cycle end? Approximately one to two weeks after the eggs are laid. (37)
11. During what phase does the maggot turn into an adult fly? the pupa stage (37)
12. How much time elapses between the laying of eggs to the development of the adult blowfly? two to three weeks (37)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Cause of Death

1. What is the meaning of post-mortem? after death (38)
2. What is another name for a postmortem examination? autopsy (38)
3. Who conducts autopsies? a forensic pathologist (38)
4. Why does a forensic pathologist weigh the organs of a corpse? Abnormal organ weight may indicate the cause of death. (38)
5. What type of incision is made on the chest of a corpse during an autopsy? a Y-incision (38)
6. What does the pathologist document before opening up the body cavity during an autopsy? any notable features, such as tattoos, birth marks, moles, wounds, bruises, and other marks on the surface of the body (39)
7. What is a hemorrhage? a bleeding inside the body (39)
8. What is used to find hemorrhages without opening up the skull? brain scans (39)
9. What is one of the most important tissue tests performed on a corpse? DNA typing (39)
10. Where are dead bodies kept before an autopsy is performed? in a mortuary (39)
11. What may be revealed in tests run on a corpse hair sample? whether or not a victim was using drugs (39)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Toxic World

1. What is a toxin? a substance that is harmful or poisonous to the human body (40)
2. What is the active drug in tobacco? nicotine (40)
3. What is the skull and crossbones logo used to symbolize today? toxic or poisonous substances (40)
4. What poisonous substance was mailed to news companies and two senators as part of a terrorist attack during September of 2001? anthrax (40)
5. How did Dr. Hawley Crippen kill his wife? He poisoned her. (40)
6. What machine is used to detect toxins in samples taken from a crime scene or a body? mass spectrometer (40)
7. What does a mass spectrometer do? It separates the molecules in a substance to tell scientists what a substance contains. (41)
8. What is the name for an electrically charged element? an ion (41)
9. What poison killed Georgi Markov? Ricin (41)
10. Why was Georgi Markov murdered? He was a Bulgarian political dissident. (41)
11. What is the most commonly used illegal drug? marijuana (41)
12. What are the symptoms of antimony poisoning? heart failure (41)
13. What poison was used to kill the Roman emperor Claudius? death cap mushroom (41)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### The Bones of the Matter

1. What is forensic anthropology? The study of how the human body varies among different ethnic groups and from different countries (42)
2. What part of the body do forensic anthropologists study? the skeleton (42)
3. What clues are found in studying a skeleton? the possible ethnic origin, sex, height, and age of a corpse (42)
4. What part of the skeleton reveals the most information about a person? the skull (42)
5. What parts of the skull give clues to the ethnic origin of a skeleton? the depth and breadth of a skull, cheekbones, eye sockets, and angle of the face, nose bridge, nasal opening, and teeth (42)
6. How do investigators reconstruct a facial image of a victim from a skull?  
By taking measurements of the skull and either using clay modeling or computer tomography to construct the facial structures of a victim (43)
7. What is the difference between traditional x-rays and computer tomography?  
Traditional x-rays only show bones while CT scans show soft tissue as well as bones. (43)
8. The points at which a CT scan of a face is fitted on a scan of a skull are called landmark points. (43)
9. What is added to the final 3-D facial reconstruction to make the model of a face look realistic? hair, eye color, skin detail, highlights, and shadows (43)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Spitting Image

1. What are CCTV cameras? Closed-circuit television (44)
2. CCTV cameras are normally used for security surveillance in stores and public places. (44)
3. Investigators will look at CCTV footage in the area of a crime scene in order to find a good picture of a suspect or a victim. (44)
4. Why do police use a series of facial components to build a likeness from a witness' description of a suspect or victim? It is a more accurate method of developing a likeness than using just the statements of a witness. (44)
5. What is an identikit? A photo identification system that is made up of photos of different facial features on strips of cards. (44)
6. Who invented the photofit or identikit? Jacques Penry (44)
7. Once a facial composite has been developed, what is the next step investigators take to identify the person? They circulate the image to police officers and the public and compare the image against a database of images already on file. (44)
8. What is the name of the computerized version of the identikit? the E-FIT (45)
9. What does a forensic phonetician study? voice patterns (45)
10. Variations in the sound of a person's voice can be used to produce a graphic representation called a voiceprint. (45)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Behavior of the Offender

1. What is geographical profiling? A study of the locations and timings of a series of crimes. (46)
2. What can be determined through geographical profiling? the possible location of a criminal's base of operation, whether the criminal has a legitimate job, and the possible locations of future crimes (46)
3. What is the job of a psychological profiler? to describe the personality and history of a criminal from the way a crime is carried out (46)
4. Polygraphs are based on the premise that a person who is lying will display physiological changes, such as rapid heartbeat, sweating, and/or changes in breathing patterns. (46)
5. How often are polygraph tests accepted as evidence in court cases? rarely (46)
6. What does a polygraph technician ask a person taking a polygraph in order to establish base readings on their physiological responses? a series of neutral questions (47)
7. What is measured during a polygraph? pulse rate, blood pressure, breathing rate, and amount of sweating (47)
8. Who killed Lee Harvey Oswald? Jack Ruby (47)
9. Is psychological profiling accurate all the time? No (47)



## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Fire Starters

1. Deliberately setting a fire in order to destroy property is called arson. (48)
2. What are the two main questions investigators want to answer in an arson case?  
How did the fire start and how did it develop to cause the damage it did. (48)
3. A material that easily catches on fire is flammable material. (48)
4. What type of machine is used to determine if an accelerant was used in an arson fire?  
a Dräger tube (48)
5. What are the most common accelerants used in arson fires? gas, paraffin, and turpentine (48)
6. What is rollover? The point during a fire when snakes of flame begin to separate from the main fire. (48)
7. What is flashover? The point during a fire when all the flammable materials in the area surrounding the main fire become so hot that the materials burst into flame, without coming into contact with the main fire. (48)
8. Is there any real evidence of spontaneous human combustion? No. (48)
9. What is the location of the biggest peacetime fire in Europe? Buncefield, England (49)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Fire Testing

1. What are some of the lethal invisible gases that may be produced when materials burn? carbon monoxide, hydrogen cyanide, sulfur dioxide (50)
2. What kills people during a fire? smoke inhalation, lethal gases, and heat (50)
3. What is tested in a smoke density chamber? the amount of smoke produced when certain material burn and the amount of heat required for a material to catch on fire (50)
4. What does a cone calorimeter test? the amount of heat energy materials give out when burned (50)
5. What is measured by an oxygen index apparatus? the flammability of a material in terms of the amount of oxygen it needs to ignite (51)
6. On the oxygen index, a lower index number indicates that a material needs less oxygen to ignite and is more flammable. (51)
7. What percentage of normal air is composed of oxygen? 21% (51)

#### Crash Investigation

1. What are the two black boxes that store data aboard commercial airplanes? the Cockpit Voice Recorder (DVR) and the Flight Data Recorder (FDR) (52)
2. What can be used to determine the speed of a vehicle before it crashed? the length of skid marks (52)
3. During major crashes, what do the investigating officers try to discover? the cause of the crash (52)
4. How many people were killed in the Lockerbie airline bombing on December 22, 1988? 270 people (53)
5. How many people died in the German Intercity Express train crash on June 3, 1998? 101 people (53)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### The Big Bang

1. How does a bomb work? A chemical reaction generates hot, high-pressure gas that blasts outward when the bomb explodes. (54)
2. What is an example of a low-grade explosive? gunpowder (54)
3. What is an example of a high-grade explosive? dynamite (54)
4. How many types of explosives are used in a typical bomb? two (54)
5. What is an incendiary device? a fire-starting device (55)
6. What is the most difficult type of bombing to guard against or neutralize? suicide bombing (55)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Computer Forensics

1. What does it mean to hack? to gain unauthorized access to information (normally through a computer) (56)
2. In 2005, who was charged with hacking into the Pentagon computer system? Gary McKinnon (56)
3. How are the police able to trace the location of a caller who makes a call from a cell phone? The police can use the location of the closest cell towers used to route the call to determine the approximate location of the caller. (56)
4. What is an MTSO? The Mobile Telephone Switching Office, routes calls from base station to base station. (56)
5. What is cyberspace? the on-line world of the internet and computers (56)
6. What is spam? unwanted emails sent to large numbers of people, often consisting of advertisements (56)
7. What is a smart card? A credit or debit card that contains a microchip. (57)
8. What does the microchip on a smart card do? It encrypts data about its user and prevents access to the information without a PIN number. (57)
9. What is a PIN number? a personal identification number, usually a three to four digit code for access to smart cards (57)
10. Why do forensic investigators remove the hard drives of computers instead of just switching on and using a computer that has been confiscated as evidence? Turning on and using the computer may make it susceptible to tampering and remote access. (57)
11. What is a virus? A malicious program that is spread from computer to computer and often corrupts data and files stored on a computer. (57)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Paper Trail

1. What are some examples of papers that forensic scientists examine for clues to crimes? blackmail letters, threatening messages, forged documents, faked checks, typed letters, photocopied papers, and paper currency (58)
2. What is used to identify if a document was printed on a specific copier or printer? tiny imperfections on the copies
3. What do some computer printers print on documents that police may use to identify the printer? a microscopic code consisting of yellow dots that shows the date, time, and printer number that printed the document (58)
4. What color will ink from a counterfeit-detecting pen turn if the currency is a counterfeit copy? black (58)
5. What type of safeguards are used to protect currency from being counterfeited? watermarks, holographic strips, high-quality paper, micro-lettering, raised print, see-through registers, and ultraviolet patterns (58)
6. What machine is used to detect impressions from writing on a notepad? Electrostatic Detection Apparatus (ESDA) (59)
7. What does an ESDA use to make the impressions made on a notepad appear? an electrostatic charge that attracts toner powder to adhere to the areas with impressions, displaying the hidden writing on the notepad (59)
8. What method was used to determine the age of the Dead Sea Scrolls? carbon dating (59)
9. How did forensic scientists determine that the diaries of Adolf Hitler were forgeries? Forensic scientists determined that the paper, ink, and binding of the diaries were not available during Hitler's lifetime. (59)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Every Picture Tells a Story

1. Who are two of the most notorious art forgers in recent years? Han Van Meegeren and Tom Keating (60)
2. How many paintings did Tom Keating claim he forged? 2,000 (60)
3. Why did Han Van Meegeren admit to forging paintings? He was accused of treason for selling art to the Nazi's during World War II. Han Van Meegeren testified that he had forged the paintings he sold to the Nazi's. He was found guilty of forgery and innocent of treason. (60)
4. What type of light will show corrections or alterations made to a painting? infrared light (60)
5. What type of light wave will show if cracking occurs throughout the layers of a painting or only on the surface? X-rays (60)
6. What test may be used to determine the age of clay figures? a test that measures thermoluminescence (61)
7. What is thermoluminescence? the naturally occurring radioactivity of substances in clay (61)
8. What famous artifact related to the death of Jesus has been tested to determine their possible age? the Shroud of Turin (61)

## 2017 Super Quiz Science - *DK Eyewitness Forensic Science*

### Review Questions Answer Key

#### Future Forensics

1. What is an RFID? a radio frequency identification device, a tiny implant that is inserted under the skin to track a person's movements (62)
2. What part of the body may be used as identification instead of a finger print? the iris (62)
3. Are the patterns of irises consistent throughout a person's lifetime? Yes. (62)
4. Is it possible to "forge" the patterns detected during an iris scan? Yes, by wearing a contact lens with the correct pattern points, but detection of the forgery is possible. (62)
5. In the future, what balance must be maintained in methods used to investigate crimes? the balance between combatting crime and keeping track of criminals with the guaranteed freedoms of individuals (62)
6. How does facial recognition work? by comparing biometric measurements of different facial features against a database of biometric measurements of the faces of known criminals (63)
7. What are some of the biometric measurements used in facial recognition software? the distance between the center of the eyes, the ends of the mouth, the length of the nose, the shape of the forehead, the distance from the end of the nose to the chin (63)
8. What information is provided to police through traffic and toll CCTV cameras? the movement, license plate numbers, and location of cars (63)
9. What type of evidence do some consider to be infallible? DNA typing (63)

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #1 Answer Key – pages 6 -15**

Circle the correct answer.

1. *Forensic* is derived from what Latin word? (6)
  - A. *formula*
  - B. *forum*
  - C. *factum*
  - D. *forte*
  - E. *forma*
  
2. What is entomology? (6)
  - A. the study of blood types
  - B. the study of genetic materials
  - C. the study of insects
  - D. the study of ballistics
  - E. the study of fingerprints
  
3. Who performs autopsies? (7)
  - A. forensic profiler
  - B. forensic pathologist
  - C. forensic anthropologist
  - D. forensic entomologist
  - E. forensic paramedic
  
4. What is toxicology? (8)
  - A. the study of poisons
  - B. the study of plant pollens and spores
  - C. the study of insects
  - D. the study of fingerprints
  - E. the study of ballistics
  
5. What is Bertillonage? (9)
  - A. an early scientific system used to identify people by their physical appearance
  - B. an early system used to identify blood types
  - C. a method of lifting fingerprints from objects
  - D. a type of DNA test
  - E. a system used to search a crime scene for trace evidence



6. Who said, "Every contact leaves a trace"? (12)
- A. Sherlock Holmes
  - B. Sir Francis Galton
  - C. Sir William Herschel
  - D. Karl Landsteiner
  - E. Edmond Locard
7. Why is evidence recorded with digital photography often challenged in court? (14)
- A. Digital photography does not produce a clear enough image of evidence.
  - B. Digital photography is not approved for use in court cases.
  - C. Digital photography is easily altered.
  - D. Digital photography is too difficult to track during the chain of custody.
  - E. None of the above

Match the person with an item in the list that is most related to him or her. Write the letter of the item on the blank next to the person's name.

- |          |                    |    |   |
|----------|--------------------|----|---|
| <u>B</u> | Kathy Reichs       | A. | An early scientific system for identifying people by their physical appearance            |
| <u>D</u> | Mathieu Orfila     | B. | The real-life scientist upon which the fictional character of Temperance Brennan is based |
| <u>A</u> | Alphonse Bertillon | C. | Founder of the first FBI forensic laboratory  |
| <u>C</u> | J. Edgar Hoover    | D. | Father of toxicology  |
| <u>E</u> | Cesare Lombroso    | E. | Invention of an early form of lie detector that measured heart rate                       |

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #2 Answer Key – pages 16 – 21**

Circle the correct answer.

1. What is a patent print? (16)
  - A. a footprint that is visible to the naked eye
  - B. a footprint that is invisible to the naked eye, but visible with a magnifying glass
  - C. a fingerprint that is invisible to the naked eye, but can be made visible
  - D. a fingerprint that is visible to the naked eye
  - E. a master copy of a digital evidence photograph
  
2. What is a linen tester? (18)
  - A. a chemical compound used to lift fingerprints from cloth
  - B. a type of compact magnification device
  - C. a machine used to test fibers
  - D. a machine used to determine different types of paper
  - E. a machine used to detect counterfeit money
  
3. What type of fingerprint pattern is the most common? (19)
  - A. whorl
  - B. loop
  - C. arch
  - D. spur
  - E. bifurcation
  
4. What type of fingerprint pattern has ridges that form closed curves in the center? (19)
  - A. whorl
  - B. loop
  - C. arch
  - D. spur
  - E. bifurcation
  
5. What test is used to determine if a stain at a crime scene is blood? (20)
  - A. DNA profiling
  - B. computer tomography
  - C. electrostatic detection
  - D. ballistics
  - E. Kastle-Meyer test

6. What are the four main blood types in humans? (20)
- A. A, B, AB, and C
  - B. A, B, O and C
  - C. A, B, O and P
  - D. A, B, AB, and O
  - E. AB, B, O, and U
7. Who developed a method of classifying blood stains according to their shape? (20)
- A. Karl Landsteiner
  - B. John Glaister
  - C. Paul Uhlenhuth
  - D. Sir William Herschel
  - E. Sir Alec Jeffreys
8. What color does a test paper turn if blood is present when a Kastle-Meyer test is administered? (21)
- A. pink
  - B. blue
  - C. purple
  - D. green
  - E. yellow

Short-answer questions:

9. To determine the blood type of a blood sample, a forensic scientist adds an anti-A reagent to the sample. If the blood sample does not clot, what are the possible blood types of the sample? B and O (20)
10. What are the six main types of bloodstain shapes used in the classification system John Glaister developed? drops, splashes, pools, spurts, smears, and trails (21)

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #2 Answer Key – pages 22 – 29**

Circle the correct answer.

1. What is another name for DNA typing? (22)
  - A. DNA tracking
  - B. genetic fingerprinting
  - C. profiling
  - D. molecular analysis
  - E. None of the above
  
2. What is another name for DNA typing? (22)
  - A. DNA tracking
  - B. genetic fingerprinting
  - C. profiling
  - D. molecular analysis
  - E. None of the above
  
3. What is a SEM? (25)
  - A. spectrographic element microscope
  - B. sniffing equipment management
  - C. scanning electron microscope
  - D. scanning electrostatic microscope
  - E. secondary evidence maintenance
  
4. Which of the following is found in dust? (26)
  - A. pollen
  - B. animal skin
  - C. fibers
  - D. dust mites
  - E. All of the above
  
5. Who confessed to murdering Louise Almodovar after grass seeds recovered from clothing connected him to the scene of the crime? (27)
  - A. Anibal Almodovar
  - B. Nicola Sacco
  - C. Bartolomeo Vanzetti
  - D. Mike Rubenstein
  - E. Dr. Hawley Harvey Crippen

Match the person with an item in the list that is most related to him. Write the letter of the item on the blank next to the person's name.

- |          |                   |  |
|----------|-------------------|--|
| <u>A</u> | Edmond Locard     | A. Author of <i>Treatise on Criminalistics</i>             |
| <u>C</u> | Sir Alec Jeffreys | B. One of the discoverers of double-helix structure of DNA |
| <u>B</u> | Francis Crick     | C. Inventor of DNA typing                                  |
| <u>E</u> | Karl Landsteiner  | D. System of classifying bloodstains by shape              |
| <u>D</u> | John Glaister     | E. Discoverer of blood groups for human blood              |

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #4 Answer Key – pages 30 – 35**

Circle the correct answer.

1. GSR is an acronym for \_\_\_\_\_. (30)
  - A. general scene reconstruction
  - B. gunshot residue
  - C. genetic spectroscopy
  - D. genetic sampling range
  - E. general smoke rating
  
2. What are the spiral grooves inside the barrel of a rifle called? (30)
  - A. sight lines
  - B. rifling
  - C. sightings
  - D. firing pins
  - E. cartridges
  
3. Which of the following firearms has the most accuracy in hitting a target? (30, 31)
  - A. sawed-off shotgun
  - B. double-barreled shotgun
  - C. single-barreled shotgun
  - D. rifle with scope
  - E. semi-automatic pistol
  
4. What part of a gun strikes and ignites the end of a bullet casing to fire the bullet? (30)
  - A. firing pin
  - B. slide
  - C. clip
  - D. magazine
  - E. stock
  
5. What equipment is used in ballistics tests? (32-33)
  - A. comparison microscope
  - B. scanning electron microscope
  - C. shooting tub
  - D. All of the above
  - E. A & C only

6. What type of search are cadaver dogs trained to perform? (34)
- A. search and rescue
  - B. bomb detection
  - C. drug search
  - D. search for dead bodies
  - E. tracking of fugitives
7. Terminal ballistics is the study of \_\_\_\_\_. (32)
- A. the trajectory of fired bullets
  - B. gunshot residue
  - C. what happens when a bullet strikes a target
  - D. the process involved as a fired bullet travels down a gun barrel
  - E. the make-up of different types of bullets
8. What can forensic investigators determine from the striations on bullets? (33)
- A. the type of gun used to fire the bullet
  - B. the distance from the target the bullet was fired
  - C. if two bullets were fired from the same gun
  - D. All of the above
  - E. None of the above
9. What do search divers use to detect objects in extremely low-visibility water searches? (35)
- A. GPR
  - B. sonar equipment
  - C. infrared cameras
  - D. helicopters
  - E. None of the above
10. What is GPR? (35)
- A. ground pattern recognizance
  - B. ground print recorder
  - C. gunshot pattern recorder
  - D. gunshot pattern residue
  - E. ground-penetrating radar

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #5 Answer Key – pages 36 – 41**

Circle the correct answer.

1. What is the definition of *putrescence*? (36)
  - A. corpse
  - B. remains
  - C. decomposition
  - D. smell
  - E. death
  
2. Which of the following are typically the first insects to arrive at a dead body? (36)
  - A. springtail beetles
  - B. ants
  - C. blowflies
  - D. rove beetles
  - E. clothes moths
  
3. What is one of the last insects to arrive at a corpse? (36)
  - A. mite
  - B. ants
  - C. wasps
  - D. blowflies
  - E. springtail beetle
  
4. What is the name of the juvenile form of an insect, especially one that differs greatly from the adult and forms the stage between egg and pupa? (37)
  - A. mite
  - B. larva
  - C. flea
  - D. beetle
  - E. bole
  
5. To access internal organs during an autopsy, a forensic pathologist makes this type of incision on the body. (38)
  - A. medial-line incision
  - B. superficial incision
  - C. Y-incision
  - D. V-incision
  - E. orthoscopic incision



6. What poison, that causes death by heart failure, is difficult to disguise because of its distinctive metal taste? (41)
- A. strychnine
  - B. antimony
  - C. ricin
  - D. death cap mushroom
  - E. arsenic
7. What is another name for marijuana? (41)
- A. heroin
  - B. cannabis
  - C. ricin
  - D. antimony
  - E. strychnine

Fill in the blank.

8. Dead bodies are kept in storage in a room called a mortuary or morgue.
9. The name given to a postmortem medical examination is an autopsy.
10. The muscular tube that runs from the mouth to the stomach is the esophagus.

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #6 Answer Key – pages 42 – 51**

Circle the correct answer.

1. What branch of forensic science aids in the identification and examination of skeletal remains? (42)
  - A. pathology
  - B. entomology
  - C. psychiatry
  - D. engineering
  - E. anthropology
  
2. A forensic anthropologist examines a long, broad skull with rounded eye sockets and shovel-shaped incisors. What is the likely ethnicity of the victim? (42)
  - A. East European
  - B. Sub-Saharan African
  - C. East Asian
  - D. Anglo-Saxon
  - E. Middle Eastern
  
3. What is an identikit? (44)
  - A. a fingerprinting kit
  - B. a photo identification kit of facial features
  - C. a type of closed-circuit security system
  - D. a blood-typing kit
  - E. a kit used by forensic investigators to gather evidence at a crime scene
  
4. What is CCTV? (45)
  - A. cross-circuit television
  - B. cross-circuit television
  - C. closed-circuit television
  - D. cross-current television
  - E. closed-current television
  
5. Speech experts who study voice recordings are called \_\_\_\_\_. (45)
  - A. pathologists
  - B. phoneticians
  - C. entomologists
  - D. profilers
  - E. anthropologist

6. What physical change(s) does a polygraph measure? (47)
- A. blood pressure
  - B. heart rate
  - C. breathing rate
  - D. amount of sweat
  - E. All of the above
7. What is another name for a polygraph? (47)
- A. psychological profile
  - B. voiceprint
  - C. fingerprint comparison test
  - D. lie-detector test
  - E. toxin test
8. Who was arrested and convicted for bombings attributed to the “Mad Bomber”? (47)
- A. John Allen Muhammad
  - B. Lee Boyd Malvo
  - C. James Buchanan
  - D. James Martin
  - E. Dr. James A. Brussel
9. The crime of deliberately setting a fire is called \_\_\_\_\_. (48)
- A. torching
  - B. combustion
  - C. accelerant
  - D. pyromania
  - E. arson
10. What instrument is used to measure the amount of heat energy a material gives off when burned? (50)
- A. calorimeter
  - B. oxygen index apparatus
  - C. mass spectrometer
  - D. precipitin
  - E. Dräger tube

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #7 Answer Key – pages 52 – 63**

Circle the correct answer.

1. What does a CVR record? (52)
  - A. the last two hours of conversations among flight crew members
  - B. the voice of the forensic pathologist during an autopsy
  - C. the testimony of an expert witness during a deposition
  - D. the testimony of witnesses in court
  - E. the gases released from the site of an arson fire
  
2. What caused the airplane crash of Pan Am Flight 103 over Lockerbie, Scotland, in 1988? (53)
  - A. mechanical failure
  - B. a crash landing
  - C. bad weather
  - D. a bomb
  - E. hijackers
  
3. Which of the following is NOT an explosive? (54-55)
  - A. gasoline
  - B. semtex
  - C. dynamite
  - D. gunpowder
  - E. sodium chloride
  
4. What is an MTSO? (56)
  - A. multiple transfer service operation
  - B. mobile transfer safety operation
  - C. mobile television service office
  - D. mobile telephone switching office
  - E. multiple telephone service organizations
  
5. In 2005, who was accused of hacking the computer system of the Pentagon? (56)
  - A. Gary McKinnon
  - B. Dr. Harold Shipman
  - C. Frank Abagnale
  - D. Bruno Hauptmann
  - E. Georgi Markov

6. What is a PIN? (57)
- A. primary investigation notes
  - B. personal identification number
  - C. printing identification number
  - D. postmortem interval number
  - E. provenance identification notes
7. Who are the most notorious art forgers in recent years? (60)
- A. Tom Keating and Han Van Meegeren
  - B. Francis Crick and James Watson
  - C. Francis Griffiths and Elsie Wright
  - D. John Allen Muhammad and Lee Boyd Malvo
  - E. Robbie Coltrane and Robert Pastorelli
8. What is an RFID? (62)
- A. radio frequency identification device
  - B. rifle filings identification database
  - C. remote frequency independent detection
  - D. residue findings identification database
  - E. remote flying instructions database
9. What part of the brain is most active when a person is lying? (62)
- A. frontal lobe
  - B. hippocampus
  - C. meninges
  - D. occipital lobe
  - E. thalamus
10. What measurements are used in facial recognition software to compare facial features? (63)
- A. the distance between the center of the eyes
  - B. the distance between the ends of the mouth
  - C. the length of the nose
  - D. the distance between the nose and the chin
  - E. All of the above

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #8 Answer Key – pages 64 - 67**

Write the letter of the book on the blank next to the author's name. (66-67)

- |           |                             |   |
|-----------|-----------------------------|---|
| <u>B.</u> | 1. Sir Arthur Conan Doyle   | A. <i>The Washing Away of Wrongs</i>              |
| <u>E.</u> | 2. Agatha Christie          | B. <i>Adventures of Sherlock Holmes</i>           |
| <u>A.</u> | 3. Sung Tzuh                | C. <i>Classification and Uses of Fingerprints</i> |
| <u>C.</u> | 4. Sir Edward Richard Henry | D. <i>Treatise of Toxicology</i>                  |
| <u>D.</u> | 5. Mathieu Orfila           | E. <i>The Mysterious Affair at Styles</i>         |
| <u>G.</u> | 6. Albert Osborn            | F. <i>Fingerprints</i>                            |
| <u>H.</u> | 7. Hans Gross               | G. <i>Questioned Documents</i>                    |
| <u>F.</u> | 8. Francis Galton           | H. <i>Criminal Investigations</i>                 |

**2017 Super Quiz Science – Forensic Science**  
**Chapter Review Quiz #9 Answer Key – pages 66-71**

Match the scientist to his invention. Write the letter of the invention on the blank next to the scientist's name. (66-71)

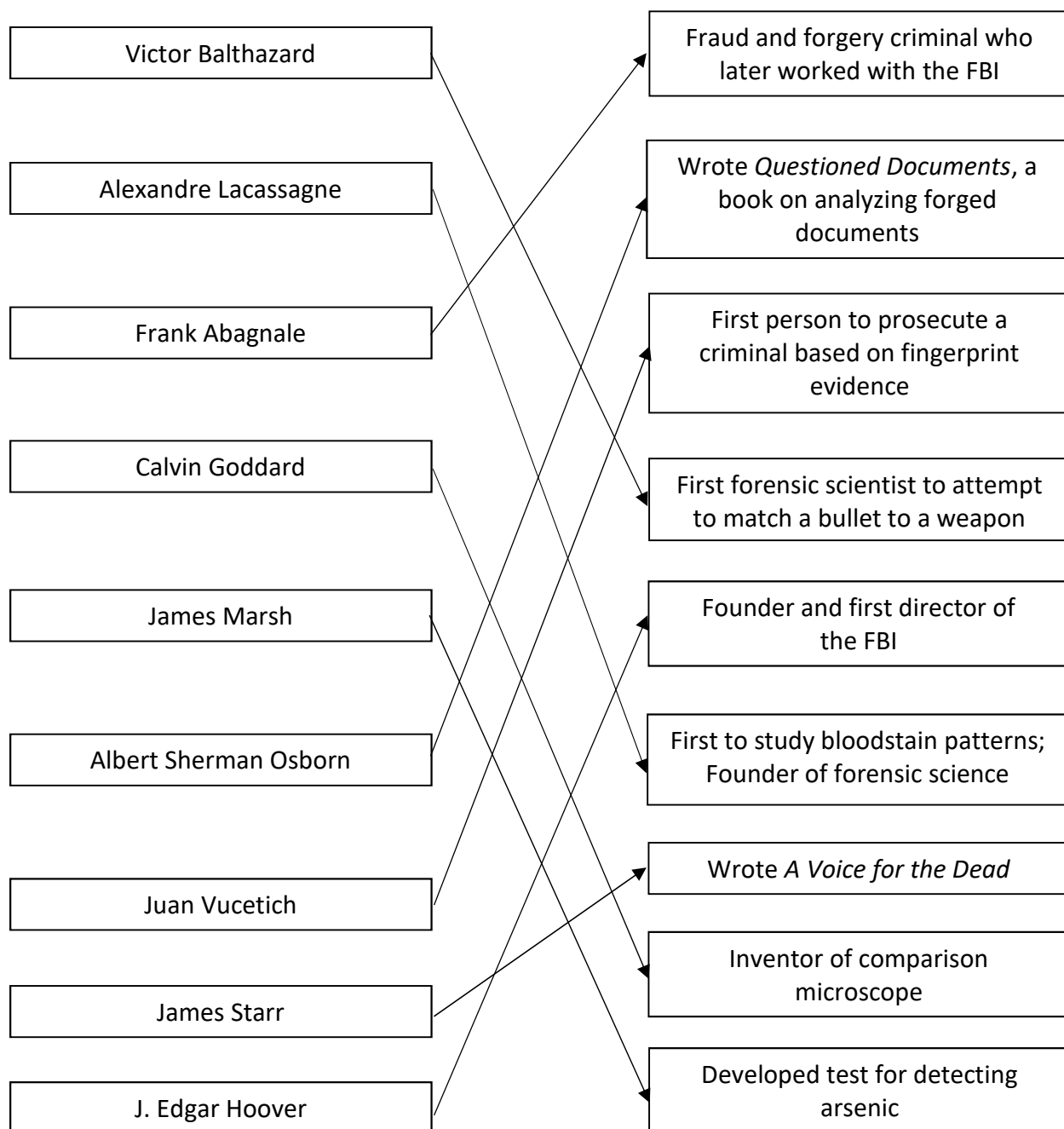
- |           |                                       |                                |
|-----------|---------------------------------------|--------------------------------|
| <u>C.</u> | 1. William Nicol                      | A. voice spectographer         |
| <u>B.</u> | 2. Philip Gravelle and Calvin Goddard | B. comparison microscope       |
| <u>F.</u> | 3. John Larson                        | C. polarizing light microscope |
| <u>J.</u> | 4. John Fisher                        | D. DNA fingerprinting          |
| <u>H.</u> | 5. Paul Uhlenhuth                     | E. Polymerase Chain Reaction   |
| <u>A.</u> | 6. Bell Laboratories                  | F. lie detector test           |
| <u>I.</u> | 7. Jacques Penry                      | G. super-glue fuming           |
| <u>E.</u> | 8. Kary Mullis                        | H. precipitin test             |
| <u>G.</u> | 9. Masato Soba                        | I. Photo-Fit ID System         |
| <u>D.</u> | 10. Sir Alec Jeffreys                 | J. helixometer                 |
| <u>K.</u> | 11. William Conrad Rontgen            | K. X-rays                      |

**2017 Super Quiz Science - DK Eyewitness Forensic Science**  
**Famous Contributors to Forensic Science - Matching Sheet Answer Key**

---

Famous Contributors to Forensics  
Matching Sheet

Draw a line connecting each person  
with his discovery or work:





**2017 SQ Science –DK Eyewitness: Forensic Science**  
**Forensic Scientists Matching Sheet**

---

**Forensic Scientists - Matching Sheet**

Draw a line connecting each person  
with his discovery or work:

