AAQ Applied Science

Summer Independent Learning

Y12 - Y13 2026

F185: Forensic Biology

Task

Read each chapter from the student textbook.

- Chapter 1: Forensic Biology Foundations
- Chapter 2: Forensic Biology Disciplines
- Chapter 3: Types of Evidence

For each chapter;

1. **Answer the recall questions fully**
2. **Complete the activities**

F185: Forensic Biology

Summer Independent Work

Cambridge OCR Level 3 Advanced National in Applied Science (H151)

This notes booklet covers the content you need for Unit F185: Forensic Biology. It follows the specification and links directly to the four tasks in your assignment.

Each chapter includes:

- Clear explanations of all the theory you need to know
- Key term definitions
- Examples and case studies to help you apply your knowledge
- Recall questions to check your understanding
- Activities that practise the skills you will need in your assignment
- Mark schemes so you can check your own work

Where you see the assignment link boxes (in purple), the content connects directly to a specific assessment criterion in your assignment. These boxes will help you understand what the examiner is looking for — but remember: in your supervised assessment you must produce your own independent work.

How to use this book

Box type	What it contains
Key term (blue)	A definition you need to learn
Example (green)	A worked example showing how to apply a concept
Case study (amber)	A real forensic investigation that illustrates the topic
Recall questions (grey)	Short questions to check you remember the key facts
Activity (amber, with mark scheme)	A longer task that mirrors what you will do in your assignment
Assignment link (purple)	Connects the content to a specific assignment criterion

Chapter 1: Forensic Biology Foundations

Forensic science is the application of scientific knowledge to legal investigations. Forensic **biology** is the part of forensic science that focuses specifically on biological evidence — anything that comes from a living or once-living organism. This chapter covers the foundations that underpin the whole subject: Locard's exchange principle, the difference between criminal and civil law, and the eight disciplines of forensic biology.

1.1 Locard's exchange principle

Every forensic investigation starts with a simple but powerful idea, first described by the French scientist Edmond Locard in the early twentieth century:

> **"Every contact leaves a trace."**

What this means in practice is that whenever two objects or people come into contact, material is exchanged between them. The exchange always happens in both directions — the perpetrator leaves something at the scene, and they also take something away.

What gets exchanged?

The transferred material might be very small — a single fibre, a few skin cells, a microscopic pollen grain — but it is almost always present if investigators look carefully enough. Common examples of trace material include:

- Hair and skin cells — shed naturally from the body and easily transferred by contact
- Fibres — from clothing, carpets or upholstery, transferred when surfaces rub together
- Blood and bodily fluids — left at a scene or on a weapon
- Fingerprints — left on surfaces touched by bare hands
- Soil, pollen and plant material — picked up on shoes and clothing
- DNA — found in cells from blood, saliva, hair roots, skin and other biological material

> **Key term: trace evidence**
> Tiny pieces of material transferred between people, objects or environments during contact. Trace evidence is often invisible to the naked eye but can be detected using scientific techniques.

Why does Locard's principle matter?

Locard's principle is the cornerstone of forensic science because it means that every crime leaves physical evidence behind. No matter how carefully a perpetrator tries to clean up, the exchange of material is essentially unavoidable.

However, it is important to understand three things about this:

1. The evidence can be very small. Detecting it requires careful collection and specialist laboratory analysis.
2. The evidence can degrade. Heat, moisture, light and time can all damage or destroy trace evidence — which is why crime scenes must be preserved quickly.
3. Finding transferred material at a scene does not automatically prove guilt. It shows contact occurred, but the context must be considered. For example, if a suspect's fibres are found on a victim, but the two people were known to each other and met regularly, this might have an innocent explanation.

> **Example: Locard's principle at a burglary**
> A burglar breaks a window to enter a house. As they climb through, they:
> - Leave paint flakes from the window frame on their jacket (scene → suspect)
> - Leave fingerprints on the glass (suspect → scene)
> - Leave fibres from their jacket on the broken glass edge (suspect → scene)

- Pick up glass fragments in the soles of their shoes (scene → suspect)

Each of these is an example of Locard's exchange principle in action. Forensic investigators will look for all of these when examining the scene and when searching the suspect's home and clothing.

Recall questions

1. In your own words, explain what Locard's exchange principle states.
2. Give two examples of trace evidence that might be transferred when a suspect pushes a victim to the ground outdoors.
3. A suspect argues that their DNA at a crime scene proves nothing because they visit that location regularly. Explain how this relates to Locard's principle, and why context is important in interpreting trace evidence.

1.2 Criminal law and civil law

Forensic scientists can be called upon to provide evidence in both criminal and civil legal cases. It is important to understand the difference between the two.

	Criminal law	Civil law
Primary goal	To determine whether a person is guilty of a crime committed against society.	To resolve disputes between individuals or organisations, usually involving compensation.
Who brings the case	The state (Crown Prosecution Service in England and Wales).	One party (the claimant) sues another party (the defendant).
Standard of proof	Beyond reasonable doubt — the jury must be sure of guilt.	On the balance of probabilities — was it more likely than not?
Outcome if found liable	Criminal conviction; possible imprisonment, fine or community service.	Usually financial compensation (damages) paid to the claimant.
Examples of forensic evidence used	DNA profiles, fingerprints, toxicology reports, bloodstain pattern analysis.	Handwriting analysis, accident reconstruction, medical expert opinion.

In criminal cases, forensic biology most commonly helps to:

- Link a suspect to a crime scene through biological trace evidence
- Establish that a crime occurred (for example, by confirming the presence of blood)
- Determine the cause and time of death in homicide investigations
- Exonerate an innocent person by showing their biological material was not at the scene

Key term: exonerate

To officially free someone from blame or suspicion. DNA evidence has exonerated many people who were wrongly convicted of crimes.

Recall questions

4. What is the key difference between criminal and civil law?
5. A forensic biologist analyses blood from a crime scene and confirms it matches the suspect's DNA profile. In which type of case is this evidence most likely to be used? Explain your reasoning.
6. Explain what it means to exonerate someone, and give an example of how forensic biology could achieve this.

1.3 Forensic science and forensic biology

Forensic science is a broad subject that covers many different scientific disciplines, including chemistry, physics, biology, computer science and psychology. Forensic biology is a specialised area within forensic science that focuses specifically on biological evidence.

Key term: forensic science

The application of scientific methods and techniques to investigate crimes and examine evidence that may be presented in a court of law.

Key term: forensic biology

A specialised branch of forensic science that focuses on the collection, analysis and interpretation of biological evidence — evidence that comes from living or once-living organisms.

Think of forensic science as an umbrella. Forensic biology sits underneath it, alongside other specialist areas such as forensic chemistry, forensic toxicology, digital forensics and ballistics. Each area uses different scientific techniques to examine different types of evidence.

Forensic biology specifically covers evidence such as:

- Blood, saliva, semen and other bodily fluids
- Hair and skin cells
- Bone and teeth
- Plant material — leaves, pollen, seeds
- Insects and other invertebrates
- Bacteria, fungi and other microorganisms

Chapter 1 Activities

Activity: Applying Locard's principle to a scenario (4 marks)

Read the following scenario carefully.

A greenhouse in a school garden was broken into overnight. Several rare orchid plants were stolen. The glass panel on the door was smashed. Muddy footprints were found on the path outside. A dark woollen fibre was found caught on the broken glass. The following morning, a suspect was found nearby with mud on their trainers and scratches on their hands.

Using Locard's exchange principle, identify four specific pieces of evidence that represent a transfer of material. For each one, state the direction of transfer (scene to suspect, or suspect to scene).

Activity: Criminal or civil? (6 marks)

For each of the following scenarios, state whether it is a criminal or civil case, and identify one piece of forensic biology evidence that might be used. Explain how that evidence would help the investigation. (2 marks each)

a) A man is found dead in suspicious circumstances. A pathologist suspects he was poisoned.
b) Two neighbours dispute ownership of a piece of land. One claims the other has been dumping rubbish on it, causing damage.
c) A woman claims she was assaulted. She has bruising and scratch marks on her arms. A suspect denies any contact with her.

Assignment link P1 — Identifying forensic biology disciplines

In Task 1 of your assignment, you will be asked to identify which forensic biology disciplines could help investigate your crime scene, and explain how each one could contribute. The next section introduces all eight disciplines. As you read through them, think about which ones would be relevant to your scenario and what specific evidence each discipline could provide.

Chapter 2: Forensic Biology Disciplines

Forensic biology is made up of several specialist disciplines, each one focusing on a different type of biological evidence. In your assignment, you will need to explain which of these disciplines are relevant to your crime scene investigation, and how each one could help.

For each discipline, you need to be able to explain:

- What area of science it covers
- What type of biological evidence it analyses
- How that evidence could help a specific investigation

2.1 Serology

Key term: serology

The identification and characterisation of bodily fluids — such as blood, saliva, semen and urine — at a crime scene.

Serologists are scientists who specialise in identifying and analysing bodily fluids. Their work is central to many criminal investigations because bodily fluids are a rich source of DNA and can provide important contextual information about a crime.

What does a forensic serologist do?

- Detect the presence of bodily fluids at a crime scene using presumptive tests (quick screening tests) and confirmatory tests
- Identify the type of fluid present — for example, distinguishing blood from saliva
- Determine whether the fluid is human or animal in origin
- Prepare samples for DNA analysis
- Analyse bloodstain patterns to help reconstruct what happened at the scene

Bloodstain pattern analysis is a particularly important part of serology. By looking at the shape, size, distribution and directionality of bloodstains, a forensic scientist can draw conclusions about:

- Where the blood originated from
- What type of impact or force created the stain
- The sequence of events during the crime
- The position of the victim and attacker

Case study: A blood spatter case

In a homicide investigation, circular bloodstains with smooth edges indicated that blood had fallen vertically from a low height, consistent with someone standing still while injured. Elongated stains with 'tails' pointed in one direction, showing the victim had been moving. A serologist used this pattern evidence to conclude that the victim was first injured while stationary and then fled — contradicting the suspect's account that a violent struggle had taken place throughout the room.

2.2 Pathology

Key term: forensic pathology

The investigation of deaths to determine the cause and manner of death, often through autopsy (post-mortem examination).

A forensic pathologist is a medical doctor who specialises in examining bodies to determine how and when someone died. They are typically called in when a death is sudden, unexplained or suspicious.

What does a forensic pathologist do?

- Perform an autopsy — an internal and external examination of the body
- Identify injuries such as wounds from blunt force, sharp force or firearms
- Determine the cause of death (what actually killed the person, e.g. blood loss)
- Determine the manner of death (how death came about — homicide, suicide, accident or natural)
- Estimate the post-mortem interval (PMI) — the time since death
- Identify signs of disease, poisoning or strangulation

Key term: post-mortem interval (PMI)

The estimated time that has elapsed since a person died. Several biological changes occur in a predictable sequence after death and can help estimate the PMI.

The stages of death — estimating the PMI

After death, the body goes through a series of physical and biochemical changes. These changes follow a broadly predictable pattern and can be used to estimate how long ago the person died:

Stage	What happens	Typical onset
Pallor mortis	The skin turns pale as blood drains from surface capillaries.	15–20 minutes after death
Algor mortis	The body cools down to match the surrounding temperature. Core body temperature drops approximately 1°C per hour.	Begins immediately
Livor mortis	Blood pools in the lowest parts of the body due to gravity, causing purplish-red discolouration of the skin.	Onset 30 minutes–4 hours; fixed by 8–12 hours
Rigor mortis	Muscles stiffen due to chemical changes. The body becomes rigid.	Onset 1–6 hours; fully fixed 12 hours; resolves 12–36 hours
Decomposition	Bacteria break down body tissues. Visible signs include bloating, discolouration and odour.	Begins 1–3 days; continues for weeks or months

In practice, estimating the PMI is complex. Temperature, humidity, body size, clothing and whether the body was moved all affect how quickly these changes occur. A forensic pathologist always considers multiple lines of evidence rather than relying on a single indicator.

2.3 Anthropology

Key term: forensic anthropology
The application of anthropological (human biology and human history) knowledge to legal investigations, primarily through the examination of skeletal remains.

Forensic anthropologists are called in when bodies are significantly decomposed, skeletonised, or fragmentary — situations where other examinations are not possible. By examining bones, they can build a biological profile of an unknown individual.

What can bones tell us?

- Age at death — growth plates in young people fuse at predictable ages; wear and degeneration in older people provide further clues
- Sex — differences in the pelvis and skull can indicate whether remains are male or female
- Stature — long bone measurements, particularly the femur (thigh bone) and tibia (shin bone), can estimate height
- Ancestry — differences in skull shape and facial features can indicate broad geographic ancestry
- Trauma — fractures, bullet holes, cut marks and other injuries on bone can reveal the cause of death and the type of weapon used
- Post-mortem interval — bone decomposition patterns can help estimate how long ago death occurred

Case study: Identifying the dead — the Balkans conflict

Between 1992 and 1995, the Bosnian War resulted in approximately 35,000 people going missing. Forensic anthropologists worked for years after the conflict to identify skeletal remains found in mass graves. By comparing bone measurements, healed fractures and dental features with records of missing persons and family DNA samples, thousands of individuals were identified and returned to their families.

2.4 Odontology

Key term: forensic odontology

The application of dental science to legal investigations, including the identification of individuals from dental records and the analysis of bite mark evidence.

Teeth are remarkably durable — they survive fire, decomposition and immersion in water far better than soft tissue. This makes them particularly valuable in cases where other forms of identification are not possible.

What does a forensic odontologist do?

- Compare dental records (X-rays, charts showing fillings, crowns and missing teeth) with the teeth of unidentified remains to confirm identity
- Analyse bite marks on victims or objects to link a suspect to a crime
- Estimate age from the stage of tooth development and degree of wear
- Detect signs of drug use or nutritional deficiency from tooth analysis

Bite mark analysis involves comparing the pattern of a bite mark found at a crime scene (on skin, food or other materials) with dental impressions taken from a suspect. However, it is important to know that the reliability of bite mark evidence is scientifically contested — courts and scientists have raised concerns about whether individual bite marks can be matched to a specific person with sufficient certainty.

2.5 Botany

Key term: forensic botany

The application of plant science to legal investigations, using plant material as evidence to link suspects to crime scenes or provide information about a crime.

Plants are everywhere, and plant material — pollen, leaves, seeds, bark, roots and wood — can be found on clothing, shoes, vehicles and bodies. Because many plant species are specific to certain geographic locations or seasons, plant evidence can help establish where a suspect or victim has been.

How is plant evidence used?

- Linking a suspect to a scene — pollen or plant fragments on clothing that match species found at the crime scene
- Establishing timelines — the flowering season of a plant can help establish when an event occurred
- Estimating the PMI — the growth or decomposition of plant material on or near a body

- Identifying dump sites — root growth patterns through remains can estimate how long a body has been in a location
- Combining evidence from different plant organs — roots, stems, leaves, flowers, seeds and fruits together build a fuller picture

Case study: Solving a murder with plants

In a 2022 US case, a forensic botanist was asked to help investigate the murder of a young woman found in a woodland. The botanist examined leaves found in the suspect's car and identified them as coming from a rare combination of species found only at the specific woodland where the body was discovered. The morphology (shape and venation pattern) of the leaves was distinctive enough to link the suspect's car to the crime scene — evidence that contributed to the conviction.

2.6 Microbiology

Key term: forensic microbiology

The use of microorganisms — bacteria, fungi, algae and viruses — as evidence in criminal investigations.

Microbiology has become an increasingly important forensic discipline as scientists have discovered that the community of microorganisms (the microbiome) on and around a body undergoes predictable changes after death.

How is microbiology used in forensic investigations?

- Post-mortem interval estimation — the necrobiome (the community of microorganisms colonising a decomposing body) changes in a predictable way over time, providing clues about when death occurred
- Place of death — every environment has a unique microbial fingerprint; comparing the microbes on a body or clothing with samples from different locations can help establish where death occurred
- Cause of death — identifying pathogenic (disease-causing) bacteria or toxins that may have contributed to death
- Individual identification — everyone has a unique microbiome, which could theoretically link a suspect to a scene
- Bioterrorism investigations — identifying the causative agent in biological attacks
- Foodborne illness outbreaks — tracing the source of bacterial contamination to hold those responsible legally liable

2.7 Ornithology

Key term: forensic ornithology
The identification and analysis of bird species, remains or droppings as evidence in criminal investigations.

Forensic ornithology is a relatively new discipline. It is used in several contexts:

- Identifying bird species found at a crime scene — even small quantities of feathers, down or droppings can be identified to species level using microscopy or DNA analysis
- Establishing the time of year — the presence of certain migratory species or seasonal behaviours can help narrow down when an event occurred
- Detecting toxins — analysing bird remains for poisons or pesticides, relevant to wildlife crime investigations such as illegal poisoning of birds of prey
- Wildlife crime — identifying illegally traded bird species or their products (feathers, eggs, nest material) to prosecute trafficking offences

2.8 Entomology

Key term: forensic entomology
The use of insects and other arthropods as evidence in criminal investigations, particularly to estimate the post-mortem interval.

Insects are attracted to decomposing bodies almost immediately after death, and they colonise in a predictable sequence known as insect succession. By identifying which insects are present and what stage of their life cycle they are at, a forensic entomologist can estimate how long a body has been at a location.

The Diptera life cycle and PMI estimation

Flies in the order Diptera (particularly blowflies and house flies) are usually the first insects to arrive at a body. They lay their eggs in natural body openings and wounds. The eggs hatch into larvae (maggots), which pass through three larval stages (instars) before forming a pupa and eventually emerging as an adult fly.

Stage	Description	Forensic significance
Egg	Laid by female flies, usually in clusters.	Eggs hatch in predictable time depending on temperature.
Larva (instar 1–3)	Maggots that feed on the body. Each stage is larger.	Stage of larval development indicates time since colonisation.
Pupa	Larva encases itself in a hard outer shell (puparium).	Presence of pupae indicates at least 5–10 days since death.
Adult fly	Emerges from pupa; can fly to new locations.	Different species arrive at different stages of decomposition.

Factors that affect insect development rates include temperature (development is faster in warmer conditions), humidity, the size and condition of the body, whether it is clothed, and the cause of death (for example, certain drugs can accelerate or retard development).

Carrion beetles (Coleoptera)

After flies have been present for some time, beetles — particularly carrion beetles in the order Coleoptera — begin to arrive. They tend to feed on drier tissues and remains later in decomposition. Their presence therefore indicates a later stage of decomposition than flies alone, and helps further refine the PMI estimate.

Chapter 2 Activities

Recall questions

7. Name the eight disciplines of forensic biology covered in this chapter.
8. What is the post-mortem interval (PMI) and why is it important in forensic pathology?
9. Explain how livor mortis can help a forensic pathologist estimate the time of death.
10. What does a forensic anthropologist examine, and what information can they obtain from bones?
11. Explain why bite mark evidence is considered controversial by scientists.
12. Give two ways in which plant material can link a suspect to a crime scene.
13. What is the necrobiome and how is it used in forensic microbiology?
14. Explain the Diptera life cycle and describe how each stage helps estimate the PMI.

Activity: Matching disciplines to evidence (8 marks)

A forensic team is investigating a suspicious death. The following items of evidence have been collected from the crime scene and the body. For each item, identify the forensic biology discipline most likely to analyse it, and explain one conclusion that analysis could help draw. (1 mark per discipline correctly identified, 1 mark per valid explanation)

Evidence	Discipline	Possible conclusion
Larvae found on the body		
Pollen on the victim's clothing		
An unknown liquid stain on the floor		
Skeletal remains with a healed fracture of the left arm		
A half-eaten piece of fruit with bite marks		
Bacteria isolated from the victim's wound		
A feather found at the scene		
The victim's body shows signs of rigor mortis		

Activity: P1 practice — explaining how disciplines aid an investigation (8 marks)

This activity practises the skills you need for P1 and M2 in your assignment.

A gardener is found dead in a greenhouse. Their body is discovered three days after they were last seen. There are signs of a struggle — plant pots are knocked over and there is a bloodstain on the floor. Insects are present on the body. A half-eaten tomato with bite marks is found nearby. A suspect is identified who is known to have visited the greenhouse recently.

Choose four forensic biology disciplines from this chapter. For each one:

- Name the discipline (1 mark)
- Explain specifically how it could aid this investigation — refer to the evidence in the scenario (1 mark)

Write your answers in the space below. Aim for 2–3 sentences per discipline.

Assignment link P1 and M1 — disciplines and justifying your choices

P1 asks you to identify the forensic biology disciplines relevant to your crime scene and explain how each could aid the investigation. The P1 practice activity above is excellent preparation for this.

M1 asks you to explain why your chosen preservation and collection methods are appropriate for the specific crime scene you have been given. As you learn more about evidence collection in Chapters 3 and 4, think about how the disciplines you have identified here would influence the collection methods you choose.

Chapter 3: Types of Evidence

Before investigators can collect and analyse evidence, they need to understand the different types of evidence that exist, what each type can and cannot prove, and how to assess the relative importance of different pieces of evidence in building a case.

3.1 Biological, physical and trace evidence

Type	Definition	Examples from a crime scene
Biological evidence	Evidence that originates from a living or once-living organism. Often contains DNA.	Blood, saliva, hair, skin cells, bone, insects, pollen, bacteria
Physical evidence	Any tangible object that can connect an offender to a crime scene or victim.	Shoe prints, fingerprints, fibres, tyre tracks, weapons, documents
Trace evidence	Tiny amounts of material transferred between people, objects or environments. Often requires microscopy or specialist analysis to detect.	Fibres, paint flakes, glass fragments, pollen grains, gunshot residue, soil

Note that these categories overlap. A human hair, for example, is both biological evidence (it comes from a person's body) and trace evidence (it is typically very small and transferred by contact). A shoe print could be both physical evidence (it is a tangible impression) and trace evidence (it may contain soil particles from the suspect's shoe).

3.2 Class evidence and individual evidence

One of the most important distinctions in forensic science is between class evidence and individual evidence. Understanding this distinction is essential for evaluating the significance of each piece of evidence in an investigation.

Key term: class evidence
Evidence that can narrow down the list of potential sources to a group of people or objects sharing the same characteristics, but cannot identify a single individual. Class evidence alone is not sufficient to prove guilt beyond reasonable doubt.

Key term: individual evidence
Evidence that can, in principle, be linked to a single specific source — one person, one object. DNA profiling and fingerprint analysis are the strongest examples of individual evidence in forensic biology.

Example: Class vs individual evidence from a shoe

Imagine a shoe print is found at a crime scene. Investigation shows it was made by a size 10 Nike Air Force trainer with a specific sole pattern.

- The shoe type and size = class evidence. Many thousands of people own size 10 Nike Air Force trainers.
- A specific wear pattern (a nick in the heel, a cut across the ball) that matches the suspect's shoe exactly = individual evidence. Only one shoe could have made that exact mark.

The class evidence narrows down the suspect pool. The individual evidence can link a specific shoe — and therefore potentially a specific person — to the scene.

Evidence type	Class or individual?	Reason
DNA profile	Individual	Each person's DNA profile is unique (except identical twins)
Blood type (ABO + Rh)	Class	Many people share the same blood type — it narrows possibilities but cannot identify one person
Fingerprint	Individual	Fingerprint ridge patterns are unique to each individual
Hair (structure only, no DNA)	Class	Hair features can indicate species, sex and ethnicity but cannot identify one person
Hair (with DNA from root)	Individual	DNA from the follicular tag provides individual identification
Fibre (type and colour)	Class	Many garments are made from the same fibre types
Shoe print (type and size)	Class	Many people own the same shoe model and size
Shoe print (specific wear pattern)	Individual	Wear patterns are unique to a specific shoe
Bite mark	Contested	Some experts argue bite patterns are individual; others dispute this

3.3 The relative importance of evidence

No single piece of evidence is more important than another in an absolute sense. The strength of a forensic case comes from the combination of multiple independent lines of evidence, each supporting the same conclusion.

When assessing the importance of a piece of evidence, forensic scientists consider:

- Is it class or individual evidence? Individual evidence is generally more probative.
- How reliable is the collection and analysis? Evidence that has been contaminated or poorly preserved is less reliable.
- Could there be an innocent explanation for its presence? Context always matters.
- Is it corroborated by other evidence? Multiple independent pieces of evidence pointing to the same conclusion are far more convincing than one piece alone.

Key term: probative value

The degree to which a piece of evidence tends to prove or disprove a fact in dispute. Evidence with high probative value strongly supports a conclusion. Evidence with low probative value provides only weak support.

Recall questions

15. Explain the difference between class evidence and individual evidence, using one example of each.
16. A red acrylic fibre is found on a victim's clothing. Explain whether this is class or individual evidence.
17. A suspect's DNA profile matches DNA found at a crime scene. Explain why this is considered individual evidence.
18. Why is it important for forensic scientists to collect multiple different types of evidence rather than relying on one piece alone?

Activity: Evaluating evidence — class or individual? (10 marks)

A forensic team has collected the following evidence from a crime scene. For each piece of evidence:

- State whether it is class or individual evidence
- Give one reason for your answer
- Suggest one further analysis that could increase its probative value (2 marks each)

19. A size 8 trainer impression found in mud outside the point of entry.
20. A blonde hair with a root attached found on the victim's clothing.
21. A bloodstain confirmed as human blood, type O+.
22. A fingerprint found on a door handle, with 12 matching ridge characteristics to the suspect.
23. Dark green fibres found on the broken window frame, consistent with wool.

Activity: D3 practice — assessing the relative importance of evidence (6 marks)

This activity practises the skill required for Distinction criterion D3 in your assignment. D3 asks you to assess the relative importance of the results from your analytical techniques — not just describe them, but explain which are most significant and why.

Read the following results from a forensic investigation and answer the question below.

Evidence collected from a crime scene:

- Result A: A DNA profile obtained from blood at the scene matches the suspect's DNA profile (probability of a random match: 1 in 1 billion).
- Result B: A size 9 Nike trainer impression found near the point of entry. The suspect owns size 9 Nike trainers.
- Result C: Dark fibres found at the scene are consistent with the type of fleece jacket the suspect was wearing.
- Result D: The suspect's blood type (A+) matches blood found on the victim's clothing.

Assess the relative importance of these four results. Explain which result has the highest probative value and which has the lowest, giving scientific reasons for your assessment. (6 marks)

Assignment link D3 — Relative importance of results

In Task 4 of your assignment, D3 asks you to assess the relative importance of the results from the analytical techniques you have performed. The activity above shows you the structure of a strong D3 response:

- Identify which results have the highest and lowest probative value
- Explain your reasoning using the class vs individual distinction
- Comment on each result before drawing an overall conclusion

Remember: a D3 response does not just describe your results — it makes a reasoned judgement about what they mean and how significant each one is.

End of Chapters 1–3

You have now covered:

- Locard's exchange principle and why it is the foundation of forensic science
- The difference between criminal and civil law
- The eight disciplines of forensic biology and how each contributes to an investigation
- The different types of evidence: biological, physical and trace
- The difference between class and individual evidence
- How to assess the relative importance (probative value) of different pieces of evidence