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Staff

The following staff are associated with this course:

Miss Amy Cowles       LJ1.35     (7)33584     a.v.cowles@keele.ac.uk
                       (Module Leader)

Mrs Victoria Cartwright LJ1.35   (7)33584     v.cartwright@keele.ac.uk
Prof Gwyn Williams     Hux301    (7)33032     g.t.williams@keele.ac.uk
Ms Lynsey Wheeldon     Hux174    (7)33872     l.wheeldon@keele.ac.uk

Safety and Laboratory Guidelines

It is essential to adopt a positive approach to safety. No list of safety rules can cover all eventualities. The design of each experiment, even of a simple test tube reaction, must include a consideration of the hazards involved. In addition to the departmental instructions on safety your attention is drawn particularly to the following points:

- You have a legal obligation to work safely, to ensure that neither you nor your co-workers are exposed to hazards, and to comply with the safety regulations issued to you at the beginning of the year.
- You must look up all Risk and Safety statements for each chemical you use to comply with the Control of Substances Hazardous to Health (COSHH) regulations.

Hazard and precaution statements can be found at:

The H and P statements are also in the Lennard-Jones Laboratories safety handbook.

- Protective and suitable clothing must be worn at all times when working in the laboratory, this includes:
  - Lab coat
  - Safety spectacles
  - Nitrile gloves when handling corrosive material
  - Shoes that do not expose any bear skin and heels only 2” or below.
  - Clothing that does not expose any bear legs, NO shorts or skirts.
  - All long hair must be tied back
  - NO contact lenses

- When working in the lab you must not:
  - Eat or drink, this includes chewing gum
  - Use mobile phones or MP3 players

- Please ensure you know the location of your closest fire exit.

**IF IN DOUBT ABOUT ANY SAFETY OR LABORATORY RULES PLEASE ASK A MEMBER OF STAFF.**

**Attendance**

Attendance at practical sessions is compulsory.

You must arrive in good time for the commencement of a laboratory session.

It is required that your completed laboratory notebook is signed by a member of staff at the end of each laboratory session.
Assessment Timetable

Assessment of the practical component is 30% of your overall module mark. In week 10 you will also have a problem session to help prepare you for your Population Genetics pro-forma which is 10% of your overall mark:

<table>
<thead>
<tr>
<th>Experiment</th>
<th>Type of Assessment</th>
<th>Weighting (%)</th>
<th>Deadline</th>
</tr>
</thead>
</table>
| 1. DNA EXTRACTION, POLYMERASE CHAIN REACTION AND GEL ELECTROPHORESIS | Lab report Pro-forma | 20% | Group A: Mon 17/11/14  
Group B: Mon 24/11/14 |
| 2. EXAMINATION OF CASE STUDY EXHIBITS | Examination Report | 10% | Group A: Mon 24/11/14  
Group B: Mon 01/12/14 |

<table>
<thead>
<tr>
<th>Problem Class</th>
<th>Type of Assessment</th>
<th>Weighting (%)</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. POPULATION GENETICS</td>
<td>Pro-forma</td>
<td>10%</td>
<td>Wed 17/12/14</td>
</tr>
</tbody>
</table>
Pre-Laboratory Preparation Guidelines

One of the most important aspects of being a scientist is maintaining a laboratory notebook;

- Before coming to a laboratory session your laboratory Notebook you should have the following:
  - Date
  - Title of the Experiment
  - Experimental Aim and specific objectives.
  - Make preliminary notes (calculations, reaction schemes, design of the apparatus, brief procedure) which may help you with the experimental work.
  - Safety section detailing the chemicals used.

Laboratory Notebook Guidelines

One of the most important aspects of being a scientist is recording observations. These should be written directly into your laboratory notebook while work is being carried out in the laboratory. For legal reasons at the end of the day work should be signed and dated and countersigned by a member of staff. This will also give them a chance to comment upon your note keeping and to suggest improvements. Results and data collected are then written up as reports or pro-formas as required.

Organisation and Guidelines for a laboratory Notebook
- Full name and contact address on front page.
- Contents page with list of experiments and pages numbers.
- All pages should be numbered, **NEVER** tear pages from your laboratory notebook.
- Your notes should be precise, clear and legible.
- Someone should be able to open your lab notebook on any page and find out what you did on a particular day.
- **NO** pencil, all work should be written in pen.
- **NO** “tippex” or other corrective marker should be used, any mistakes should be crossed using a single line.

For each experiment your notebook should include:

- Title and date.
- Aims and objectives.
- Additional notes such as a reaction scheme or design of the apparatus.
- Safety section.
- Procedure, particularly anything that differs from the lab script.
- Observations.
- Results, including any pictures taken of you agarose gel.
- Calculations.
- Conclusion and any literature references.
- Your signature/date and countersigned signature of a member of laboratory staff.
# Laboratory Schedule

Lab sessions will be in either the Darwin labs in Huxley building, or the Lennard-Jones Laboratories. Lab sessions will be 10-12 on Mondays.

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Date of Lab Session</th>
<th>Experiment Title</th>
<th>Group Attending</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29.09.14</td>
<td>No laboratory Session</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>06.10.14</td>
<td>DNA Extraction (Darwin lab 2/3)</td>
<td>Group A</td>
</tr>
<tr>
<td>3</td>
<td>13.10.14</td>
<td>DNA Extraction (Darwin lab 2/3)</td>
<td>Group B</td>
</tr>
<tr>
<td>4</td>
<td>20.10.14</td>
<td>PCR (Darwin lab 2/3)</td>
<td>Group A</td>
</tr>
<tr>
<td>5</td>
<td>27.10.14</td>
<td>PCR (Darwin lab 2/3)</td>
<td>Group B</td>
</tr>
<tr>
<td>6</td>
<td>03.11.14</td>
<td>Gel Electrophoresis (Darwin lab 1)</td>
<td>Group A</td>
</tr>
<tr>
<td>7</td>
<td>10.11.14</td>
<td>Gel Electrophoresis (Darwin lab 1)</td>
<td>Group B</td>
</tr>
<tr>
<td>8</td>
<td>17.11.14</td>
<td>Search and Recovery (LJ1.70)</td>
<td>Group A</td>
</tr>
<tr>
<td>9</td>
<td>24.11.14</td>
<td>Search and Recovery (LJ1.70)</td>
<td>Group B</td>
</tr>
<tr>
<td>10</td>
<td>01.12.14</td>
<td>Population Genetics problem class (LJ1.70)</td>
<td>Group A and B</td>
</tr>
<tr>
<td>11</td>
<td>08.12.14</td>
<td>Assessment feedback/GW revision (LJ1.70)</td>
<td>Group A and B</td>
</tr>
<tr>
<td>12</td>
<td>15.12.14</td>
<td>No laboratory session</td>
<td></td>
</tr>
</tbody>
</table>
Recommended Reading

- *Forensic Biology*; Richard Li; (2008) CRC Press; Boca Raton, FL, USA
- *Forensic DNA Typing, (2nd Edition); Biology, Technology, and Genetics of STR Markers*; John M. Butler (2005) Academic Press; MA, USA (ebook)
- *Advanced topics in forensic DNA typing*; John M. Butler (2010) Academic Press; MA, USA (also as an e-book)
DNA EXTRACTION, POLYMERASE CHAIN REACTION AND GEL ELECTROPHORESIS

Safety Information
This experiment has been assessed for the purposes of the COSHH regulations. All the procedures have been assigned a risk level of 1 with the exception of those involving the following reagent:

<table>
<thead>
<tr>
<th>Reagent</th>
<th>Hazard</th>
<th>Risk Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethidium bromide</td>
<td>Mutagen</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Special Safety Precautions

1. Wear safety glasses and gloves when handling solutions containing this reagent.

2. Solid waste containing ethidium bromide (stained gels) must be disposed of in the container provided, along with any contaminated tips.

3. Ultraviolet light is used to excite fluorescence. Always wear UV protective eye goggles or visors when visualizing gels, AND make sure the protective screen is in position to protect your face and hands. The use of the UV source must be supervised by a demonstrator or member of staff. Wear gloves when measuring band migration.
DNA EXTRACTION, POLYMERASE CHAIN REACTION AND GEL ELECTROPHORESIS

In the three practical sessions you will go through the techniques used to produce a DNA fingerprint. You will extract DNA from your own cheek cells (Day 1), use the Polymerase Chain Reaction (PCR) to amplify specific fragments from your DNA templates (Day 2) and analyze the products using agarose gel electrophoresis (Day 3). The PCR process for amplifying nucleic acids is covered by US Patents 4,683,195 and 4,683,202, owned by Hoffman-LaRoche.

Outline Programme

Day 1

1. Rinse cheek cells into suspension with mouth rinse.

2. Centrifuge cells to form a pellet and remove supernatant

3. Resuspend cells in pellet with Chelex resin and heat.

4. Centrifuge to spin down Chelex resin and cell debris.

5. Remove 100 µl of supernatant and store frozen- this contains your genomic DNA.
Day 2

1. Prepare reaction tubes containing primers, DNA template, DreamTaq polymerase and sterile water.

2. Place your (labelled!) reaction tubes in the thermal cycler.

3. When the PCRs have finished your tubes will be placed in the freezer for analysis in the next practical session.

Day 3

1. Load samples onto the gel (which contains ethidium bromide (observe the precautions in the detailed notes) and run electrophoresis (60 minutes).

2. View with UV light and photograph the gel (observe the precautions in the detailed notes).

3. Analyse your results.
**Experimental**

**Day 1: DNA Extraction**

1) Rinse your mouth with the deionized water (3ml) contained in the plastic tube provided, scraping the sides of the mouth with your tongue to release more cells.

2) Spit the rinse into the plastic tube.

3) With the 1ml micropipette, transfer 1ml of the spitted solution into a sterile Eppendorf tube – label with your initials. Discard yellow tip in Virkon-containing waste (plastic tube).

4) Add Virkon disinfectant to remaining “spitted” water in plastic tube.

5) Spin your 1ml ‘spit’ sample in the microcentrifuge at 13,000rpm for 5min.

6) You should see a white pellet (your mouth cells) and clear solution (the supernatant) on top of it. Drain tube onto tissue (upside down and gently tapping down any liquid) to remove the supernatant – leaving the white pellet in the tube, some individuals epithelial cells are more adhesive than others. Discard tissue in waste for autoclaving bin.

7) **Vortex tube containing 10% (w/v) Chelex resin vigorously.** This step is vital – if you do not homogenise the Chelex resin mixture immediately before each use, your extraction will not work!

8) Add 250μl of Chelex (with the p1000) into the tube containing the pelleted mouth cells.

9) Resuspend the cells with a 200μl pipette (set at 200), gently sucking them in and out into the Chelex, pipetting up and down 2-3 times. **MAKE SURE THE WHOLE PELLET IS SUSPENDED.**

10) Heat at 65°C for 20min. Vortex briefly.

11) Place tubes in a dry heating block at 100°C and boil for 5 min to lyse the cells and release the nucleic acids.
12) Spin the tube containing the cell-Chelex mix in a microcentrifuge at 13,000rpm (or maximum speed) for 1min.

13) This time you should see a cell debris-Chelex pellet covered by a clear solution (the supernatant) containing the cell’s nucleic acids. **Make sure you do not throw away the supernatant since this is the bit you want – it contains your DNA suitable for PCR.**

14) Remove 100µl of the supernatant into a **fresh, sterile, labelled** 1.5ml Eppendorf tube. This solution will be frozen until Day 2.

15) Place the sealed tube containing cell debris-Chelex/remaining supernatant in waste bin for autoclaving.
Day 2: Preparation of Polymerase Chain Reactions

The reagents used in these experiments are very expensive. Handle them with care and be clear in your mind what you are doing before you use them.

You are provided with:

- Oligonucleotide DNA primers.
- DNA templates extracted from your cheek cells on Day 1 and stored frozen. Additional human and mouse DNA.
- Dream Taq DNA polymerase (5U/µL) (2x in buffer containing 20 mM Tris-HCl (pH 8.0), 1 mM DTT, 0.1 mM EDTA, 100 mM KCl, 4 mM MgCl<sub>2</sub>, 50% (v/v) glycerol and 2 tracking dyes, also 0.4 mM of each dNTP.
- Molecular grade sterile water.

KEY

A – Dream Taq DNA polymerase
B – Primers pair
JK – Unknown DNA from Jurkat cells from an immortalized line of T Lymphocytes (derived from the blood of a male patient with T-cell leukemia).
MO – Mouse DNA
H<sub>2</sub>O – Sterile distilled water.

Always use autoclaved pipette tips and reaction tubes. Never touch these without wearing disposable gloves. Because of the high degree of amplification in PCR, contamination with very low levels of extraneous
DNA can easily affect the results. This experiment therefore requires very careful experimental technique.

IMPORTANT! Any reagent or sample that has been frozen will need to be thoroughly defrosted and briefly vortexed before use.

Label 6 sterile small reaction tubes and add the reagents in the order shown below (table 1) using an air displacement auto-pipette. If you are in doubt about the accurate use of the pipette, practise dispensing small volumes of water into a spare tube before dispensing the reagents. Staff will be glad to demonstrate the care required.

For economy combined with minimum risk of cross contamination, use a single tip to add water to each tube, another to add DreamTaq DNA polymerase and another to add PCR primer pair; but use a new tip each time you pipette DNA template. If you accidentally contaminate a tip during a series of additions (e.g. by letting the end touch the bench) discard it and use a fresh tip. When adding the 2μl DNA samples, put the tip under the surface of the liquid in the tube and expel directly into the liquid.

<table>
<thead>
<tr>
<th>Tube</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterile H₂O (H₂O) (µL)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>DreamTaq (A) (µL)</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Primer pair (B) (µL)</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Cheek DNA 1(µL)</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheek DNA 2(µL)</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheek DNA 3 (µL)</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JK DNA (JK) (µL)</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MO DNA (MO) (µL)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Table 1

Samples 1, 2 and 3 are from Part 1, so use both group member’s DNA and then an individual’s DNA from another group.
When the additions are complete, close the reaction tubes and mix well using a vortex and briefly centrifuge at low speed in the micro-centrifuge to collect the contents at the bottom. (Remember to place the tubes symmetrically to balance the centrifuge rotor).

Make sure that your tubes are marked to identify your group as well as being numbered.

The thermal cycler will be started when all the groups’ tubes are ready. While it is running watch the temperature reading for one or two cycles and verify that it is functioning correctly.

The programme is:

- Initial denaturation 4 min 94°C
- Denaturation 1 min 94°C
- Annealing 1 min 43.5°C \[\times 30\text{ cycles}\]
- Elongation 1 min 72°C

Final elongation 4 min 72°C

Then to 0°C.

The samples will then be stored in the freezer for the next session (Day 3).
Day 3: Analysis of Polymerase Chain Reaction Products

You are provided with:

- Your PCR products from the previous session (Day 2).
- DNA size markers (M) - (100bp ladder; 800pb band double intensity);
- A 1.5% (w/v) solution of agarose in Tris/borate/EDTA buffer (pH 8.2) which has been melted by steaming, cooled to 60°C, and set in a gel mould. This gel contains ethidium bromide.
- Tris/borate/EDTA running buffer (pH 8.2);

Take care with anything that contains, or could be contaminated by, ethidium bromide.

<table>
<thead>
<tr>
<th>Ethidium Bromide</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Ethidium Bromide hazard symbol]</td>
</tr>
<tr>
<td>H: 302, 330, 341</td>
</tr>
<tr>
<td>P: 260, 281, 284, 310</td>
</tr>
<tr>
<td>Danger</td>
</tr>
</tbody>
</table>

Setting up and loading the gel

When the gel has set, wearing gloves remove the tape at each end and carefully remove the comb to leave the sample wells exposed. Add gel running buffer to cover the gel completely.

Load the samples into the wells (20μl of sample/well, and 5μl DNA ladder (Markers) into an adjacent well), discarding the tips into the ethidium bromide waste container.
Running the gel

The electrodes are now connected to the power supply with the CATHODE (-ve; black terminal) at the well end of the gel. The DNA fragments are polyanionic (negatively charged), due to ionisation of the phosphate residues and during electrophoresis migrate towards the ANODE (+ve; red terminal). Run the electrophoresis for about 1 hour at 100V.

Visualisation of the gel bands

Turn off the power supply. A demonstrator will remove the gel for you.

Place the gel on the UV illuminator. Note: UV light can be extremely damaging to eyes – ensure that you are wearing UV protective goggles and close the door of the illuminator before turning on the UV light. The gel will be photographed for you and made available to you online. Band migration can be measured from the photograph.

Gel photos will be loaded onto the KLE after the lab session.

TEMPLATE LAB REPORT/PRO-FORMA (available on the KLE)
DNA EXTRACTION, POLYMERASE CHAIN REACTION AND GEL ELECTROPHORESIS

TEMPLATE LAB REPORT/PRO-FORMA

SECTION A (25 marks)

Procedure

1) During the extraction of your DNA from your buccal cells Chelex was added. Explain the use of Chelex in the DNA extraction stages and briefly describe another commonly used extraction method used for forensic samples. **(10 marks)**

2) Complete the table below clearly indicating the volume of each reactant in each PCR tube. **(2 marks)**

<table>
<thead>
<tr>
<th>Tube:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterile Water (H₂O)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dream Taq (A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primer pair (B)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Cheek DNA 1</td>
<td></td>
<td></td>
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<tr>
<td>Cheek DNA 2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cheek DNA 3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>JK DNA (JK)</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Mouse DNA (MO)</td>
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</tr>
</tbody>
</table>

3) What is the purpose of PCR tube number 6? **(3 marks)**

4) At room temperature conventional Taq polymerase can show low but noticeable activity leading to non-specific amplification products. Explain how PCR set-up can be modified to avoid this room-temperature activity, particularly the practice of hot-start PCR. **(10 marks)**
SECTION B (35 marks)

Results

1) Attach a copy of the printout of your agarose gel below. (Draw the positions of the bands on the gel; pasting in the gel picture given is OK).  
   (5 marks)

2) Complete the table (10 marks) and graph (10 marks) to show the migration and size of bands for each of the standards (size marker is 100bp -1000bp in 100bp increments). Please ensure these measurements match the picture attached, i.e. don’t re-scale the image after you have taken measurements.

<table>
<thead>
<tr>
<th>Size Standard (bp)</th>
<th>Distance migrated (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
</tbody>
</table>
Plot the distance that each band in the size marker (100bp to 1000bp) has moved from the edge of the sample well. Take care as the 100bp fragment should have migrated the furthest and may have run off the end of the gel.
3) Complete the table to show the migration and size of fragments in each of your PCR samples (put N/A if there are no detectable bands). This question is worth 10 marks, so please measure at least 5 bands. If you have a lot of bands you do not need to measure them all. (10 marks).

<table>
<thead>
<tr>
<th>Tube:</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration of band (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of fragment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The tube of prepared DNA labelled “MO” contained mouse DNA, and the tube of prepared DNA labelled “JK” contained cells from an immortalized line of T Lymphocytes (derived from the blood of a male patient with T-cell leukemia).

SECTION C (10 marks)

Conclusion

1) Write a brief discussion detailing the similarities and differences between the DNA samples fingerprinted. (5 marks)

2) Explain any experimental errors that may occur in this experiment. (5 marks)
1) 6 "DNA fingerprints" derived from Southern blotting with a hypervariable DNA probe are shown. M and D are both the parents of 3 of the 4 children (1-4). Identify these children and **justify your answer.** (5 marks)

2) What is the likely relationship of the other child to M, D and the other 3 children, **explain your answer?** (5 marks)
This is the pedigree of an imaginary family affected by an inherited genetic disorder that kills affected individuals during the first few weeks after birth. Filled symbols represent affected individuals. Recent work has led to the identification of a variable number of tandem repeat (VNTR) locus close to the gene that is defective in this disorder. Below the pedigree is the profile of bands obtained by hybridizing a radioactive probe homologous to this VNTR to a Southern blot of DNA obtained from each available member of the family. Included are a sample obtained by amniocentesis from the foetus (III6) carried by woman II4 who is 16 weeks pregnant and a sample from frozen tissue from her first child (III4) whom she lost to the disease. To simplify interpretation, the band pattern for each family member is aligned below their symbol in the pedigree. No DNA was available for II3 (males represented by squares, and females represented by circles.)
1) What is the mode of inheritance of this genetic disorder, explain your answer? (5 marks)

2) Which of the bands (a-e) is associated with the defective gene in this family, explain your answer? (5 marks)

3) Is foetus III6 female or male, explain your answer? (5 marks)

4) Is foetus III6 affected, a carrier, or neither, explain your answer? (3 marks)

5) Which other individuals in the pedigree are carriers, explain your answer? (2 marks)
EXAMINATION OF CASE STUDY EXHIBITS

Your lab work for this piece of assessment will be marked out of 20.

5 marks will be awarded for the pre-laboratory work; task 1 (2 marks) and task 2 (3 marks) see page 29- **pre-lab work**. Failure to do this before the session will result in a 0 for this section.

The remaining 15 marks will be awarded for quality of your submitted examination form.

The following aspects of the examination report will be assessed:

- Correct completion of examination report, following instructions given in the lab session (marks will be deducted for incorrect recording of information).
- Detail of description and quality of sketches of item.
- Recording of presumptive test and interpretation of presumptive test results.
- Details of further analysis to be completed on item.
- Overall presentation of report.

Examination report forms will be provided for you in the lab session.

**Further information on filling out an examination report form will be provided during the lab session.**
Safety Information

Body fluids potentially contain pathogenic microorganisms or viruses (including hepatitis B and human immunodeficiency virus). Body fluids for this practical are obtained from the National Blood Service and have tested negative for HIV 1 and HIV2, Hepatitis B and C and TP.

This does not mean that screened blood is negative for all known blood-borne pathogens, and as such should be treated as a hazardous substance.

Refer to COSHH/Risk assessment form provided for further information on the chemicals used in this laboratory session.

Case Scenario

Claire JENKINS, 17 years old was walking home via St.Albans Rd, Newcastle-Under-Lyme, Staffs on Friday 6th Nov 2014 at 9.20pm when she was attacked. JENKINS claims that she was dragged into an area of bushes about 3 metres from the main road and raped. She identified her attacker as Jonathan PRICE a school associate.

PRICE has confirmed that he saw JENKINS walking home, he claims that he waved and said hello from across the road but denies attacking and raping her.

Items Recovered for Forensic Examination

Exhibits were taken at approximately 6.00 am on Saturday 8th Nov 2014.

VC1 Blue coat from JENKINS
VC2 Blue jeans from JENNKINS
VC3 White T-Shirt from JENKINS
VC4 Knickers from JENKINS
VC5 Bra from JENKINS
VC6 Black ballet pump shoes from JENKINS
VC7 Pubic hair combings from JENKINS
VC8 Pubic hair control pulled/cut from JENKINS
VC9 External vaginal swab from JENKINS
VC10 Internal vaginal swab from JENKINS (2 high, 2 low, frozen)
VC11 Swab from neck of JENKINS where she alleges she was kissed by PRICE
VC12 Control skin swab
VC13 Head hair control from JENKINS (25 cut hairs collected)
VC14 Buccal sample from JENKINS (frozen after collection)
VC15 Clippings and debris from fingernails of left hand from JENKINS
VC16 Clippings and debris from fingernails of right hand from JENKINS

Exhibits were taken at approximately 1.00 pm on Saturday 8\textsuperscript{th} Nov 2014.

AC1 Blue denim jacket from PRICE
AC2 Black trousers from PRICE
AC3 Dark green jumper from PRICE
AC4 Navy blue T-shirt from PRICE
AC5 Underpants from PRICE
AC6 White trainers from PRICE
AC7 Black socks from PRICE
AC8 Pubic hair combing from PRICE
AC9 Pubic hair control pulled/cut from PRICE
AC10 Head hair control from PRICE (25 cut hairs collected)
AC11 Buccal sample from PRICE (frozen after collection).
AC12 Penile swabs (frozen after collection, sterile water used to moisten swabs also submitted).
Pre-Lab Work

**Task 1: To be completed in your lab book BEFORE the lab class (2 marks)**

There are several items (listed above) that have been submitted for forensic examination however when you arrive at work on Monday morning there will be an opportunity for you to ask the officer in charge (OIC) of the investigation additional questions. Consider any information that that may help with this investigation and if there is any information that you wish to be clarified. Note down these questions in your lab book.

**Task 2: To be completed in your lab book BEFORE the lab class (3 marks)**

1) Make a list of the potential trace evidence that may be important in this case.
2) Which exhibit(s) would you examine first and why?
3) What method could you use to **confirm** the presence of semen?

**Experimental Procedure**

You have received item AC5 for examination in the lab, there is a small (5mm x 5 mm) red/brown substance (RBS) on the item. You have received the item in a paper bag; record all details of the packaging and labelling on your examination form.

Once you have documented all details of the packaging and labelling, open your exhibit and begin your forensic examination making detailed notes on your examination form. **You will be given additional guidance to assist you in your examination.**

Once you have finished your examination get your reporting officer (RO) to sign the CJA label before you leave the lab.