



# FORENSIK SCIENCE

Group....

Group Members:

1. ....
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7. ....



# FORENSIC SCIENCE

## A. Introduction

| Question                                                                    | Expected Answer |
|-----------------------------------------------------------------------------|-----------------|
| What do you know about Bioinformatics?                                      |                 |
| What do you know about Forensic Science?                                    |                 |
| What are the roles of Forensic Science in everyday life?                    |                 |
| How important is Bioinformatics in helping Forensic Science?                |                 |
| What are the stages of Bioinformatics in solving Forensic Science problems? |                 |
| What are the tools used in Forensic Science                                 |                 |
| Is there a connection between Forensic Science and Genetics?                |                 |

Now, let's watch a video on Forensic Science and DNA Fingerprinting.

a). Forensic

<https://youtu.be/i7Lg0dUDzxk>





b). DNA Fingerprinting

<https://www.youtube.com/watch?v=7onjVBsQwQ8>



**After watching the two videos above, give us your comments and thoughts!**

## **B. Investigations**

On March 4, 2023, there was a major fire at **Pertamina Pelumpang Depo** in North Jakarta, Indonesia. The fire was caused by a leak in the Pertamina gasoline pipeline object. A total of 33 victims were identified. Conventional identification methods left 6 victims unidentified. From the accident site, there are 6 victims who have not been identified and only fragments of the victim's bones remain. To identify them, they were sent to the Laboratory of Molecular Biology, then samples were taken from the victim's family or DNA left on the victim's toothbrush or hair. In this case, mtDNA and STR profiles were used to assist the genetic investigation

Modified from Article: Korban Jiwa Kebakaran Depo Pertamina Pelumpang Bertambah. (2023). <https://bit.ly/KebakaranPertaminaPelumpang>

The following is the victim's DNA (**Sample A**) which will be aligned with the DNA of the next of kin or the DNA left on the victim's toothbrush or hair (**Sample B**).

### **Sample A**

>A1

CGCAGAAGCTGCTCGTGTCAAATTAAGAGAAACGCACTGATGTTAAGCAT

>A2

CACACCCGCGGTGACTTGACATGCGATTGCTCCCTAAGGTCTATCTCC

>A3

GAGCAAGTACAGCAAGTGTGGTCGCAAGGACCTACCCCGCGTATCGGCA

>A4

CACACCCGCGGTGACTTGACATGCGATTGCTCCCTAAGGTCTATCTCC

>A5

ATGGGGGAAGGAACCGCCAGGCCAACGGTTTTTCGGTGAGTTCACATTG

>A6

TCGGTGACAAACCCAGACTTCATCGTACGACCATTTTGAGTTGCAGAAGC

>A7

TTACCTAGCCGATCAGCATGAGAACGGGAAAATAGCCCACGGAGGCTACT

**Question, from the DNA samples presented, is there the same DNA?**

**Sample B**

>B1

CACACCCGCGGTGACTTGACATGCGATTGCTCCCTAAGGTCTATCTCC

>B2

CGCAGAAGCTGCTCGTGTCAAATTAAGAGAAACGCACTGATGTTAAGCAT

>B3

AGCCAAGTACAGCAAGTGTGGTCGCAAGGACCTACCCCCGCGTATCGGAG

>B4

TCGGTGACAAACCCAGACTTCATCGTACGACCATTTTGAGTTGCAGAAAT

>B5

TTACCTAGCCGATCAGCATGAGAACGGGAAAATAGCCCACGGAGGCTACT

>B6

ACACAGGAAGGAACCGCCAGGCCAACGGTTTTTCGGTGAGTTCAACCTG



## 1.Using Sequences Manipulation Suite (SMS)

a. Access the following link

[https://www.bioinformatics.org/sms2/color\\_align\\_prop.html](https://www.bioinformatics.org/sms2/color_align_prop.html)

**SMS**

Formal Conversion  
 Genbank to FASTA  
 EMBL to FASTA  
 EMBL Feature Extractor  
 Fasta to Genbank  
 Genbank to FASTA  
 Genbank Feature Extractor  
 Genbank Trans Extractor  
 One to Three  
 Range Extractor (DNA)  
 Range Extractor Protein  
 Reverse Complement  
 Split Coding  
 Split FASTA  
 Three to One  
 Window Extractor DNA  
 Window Extractor Protein

**Sequence Analysis**  
 Clustal W  
 Clustal Usage  
 GDI Aligner  
 GDI Molecular Weight  
 GDI Pattern Find  
 GDI Stats  
 Lazy Search Disk  
 LSI Search  
 Motif and Dna  
 Multi Seq. Trees  
 Mutator for Digest  
 OGBT Finder  
 Patterns Align Colors  
 Patterns Align DNA  
 Patterns Align Protein  
 PCR Primer Sites  
 PCR Products  
 Protein Shaker  
 Protein Scheduling Page  
 Protein Molecular Weight  
 Protein Pattern Find  
 Protein Stats  
 Restriction Digest  
 Restriction Summary  
 Reverse Translate  
 Translate

**Sequence Figures**  
 Color Logo Construction

## Sequence Manipulation Suite:

### Color Align Properties

Color Align Properties accepts a group of aligned sequences (in FASTA or GDE format) and colors the alignment. The program examines each residue and compares it to the other residues in the same column. Residues that are identical or similar among the sequences are given a colored background. The color is chosen according to the biochemical properties of the residue. You can specify the percentage of residues that must be identical and similar for the coloring to be applied. Use Color Align Properties to highlight protein regions with conserved biochemical properties.

Pass the **aligned sequences** in FASTA or GDE format into the text area below. Input limit is 200,000,000 characters.

- Show  residues per line.
- Percentage of sequences that must agree for identity or similarity coloring to be added
- Used colored .

Enter the starting positions of the sequences separated by commas (to alter residue numbering). An example entry is: **9,200,0,-1**. If no numbers are given, the default starting position of 0 is used for each sequence.

\*This page requires JavaScript. See browser compatibility.  
 \*You can mirror this page or use it off-line.

[new window](#) | [home](#) | [citation](#)

Sun Jul 14 10:30:08 2002  
 http://jmol.biology.uconn.edu/

**Please analyze the aligned DNA!**

After you have solved the Forensic Science problem above, look for another case to find a solution using the bioinformatics methods you have learned.



Please answer the questions below again

| Question                                                                    | Expected Answer |
|-----------------------------------------------------------------------------|-----------------|
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| How important is Bioinformatics in helping Forensic Science?                |                 |
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Let's look at your answers after doing the activities in this lesson. If your answers change, become more detailed and better than before, congratulations! Your understanding is improving. However, if your answers after these activities remain the same, don't worry, please study again and consult your teacher.