

A Whale of a Tale:

Using BLAST to Identify the Source of Mitochondrial DNA from Whales

Your teacher has made available to you a digital document containing mitochondrial DNA sequences from four unknown samples. You will be using BLAST to identify the source of these sequences. BLAST is an online tool that allows you to compare biological sequences (DNA, RNA or protein) to an online database of sequences from a wide variety of organisms. All you have to do is cut and paste the unknown sequences into the website and the BLAST tool does the search work for you. The information generated will allow you to solve the problem outlined in your scenario.

Procedure:

1. Read through your scenario.
2. Open up your *Unknown Mitochondrial DNA* file in a separate window or document.
3. Go to the NCBI BLAST website: <https://blast.ncbi.nlm.nih.gov/>
4. Click on “Nucleotide BLAST.”



5. In the “Enter Query” section, copy and paste the first mtDNA sequence given to you on the unknown nucleotide sheet. Make sure to copy and paste one sequence at a time.

This is a screenshot of the "Enter Query Sequence" section of the NCBI BLAST website. It includes a large text box for pasting the query sequence, a "Clear" button, and a "Query subrange" section with "From" and "To" input fields. Below the text box, there is an "Or, upload file" section with a "Choose File" button and a "No file chosen" status. There is also a "Job Title" input field and a checkbox for "Align two or more sequences".

6. At the bottom of the page, click on the BLAST button

This screenshot shows the bottom of the BLAST interface. It features a prominent blue "BLAST" button. To its right, there is a search bar with the text "Search database Nucleotide collection (nr/nt) using Megablast (Optimize for highly similar sequences)". Below the search bar is a checkbox labeled "Show results in a new window".

7. After a few seconds, your results will appear.

8. In the “Description” tab, look for as close to 100% match that you can find.
9. The first two words are the genus and species of the organism. Write this in your data table for the appropriate specimen.
10. Follow steps 5 – 9 for the remaining unknown nucleotide sequences.
11. When you have finished running your sequences through BLAST, do an Internet search to find the common names of the species that you have identified and enter them into the table.

Sources of the Unknown mtDNA Samples

Specimen #	Scientific Name	Common name
1		
2		
3		
4		

Conclusion:

Write a paragraph explaining the significance of your findings in relation to your scenario.

[illegible]