

DNA Scavenger Hunt

Each of you comes to this class with a wide range of knowledge concerning DNA. This scavenger hunt will give you the opportunity to show what you know and to discover that which you “forgot” from freshman biology and some information that you will need to add to your “library of knowledge in forensics”. You will be asked various questions and then given websites to help you find the answers. If you already know the correct answer and are confident about its accuracy, go to the next question. Please answer on a separate sheet of paper

DNA Background Information

1. Who is Gregor Mendel and what is he famous for?
2. Why did Watson and Crick receive the Nobel prize in 1953?
3. What does DNA stand for?
4. Draw the structure of DNA – make sure that all labels indicate the 5’-3’ backbone and all proper bonds for each nitrogenous base.
5. Explain DNA replication
6. Explain the process of transcription and translation
7. As of 2001, how many genes is known to be found in the human body?
8. What do A, T, G and C stand for?
9. Explain Chargaff’s principle (hint: Chemistry)
10. What are Purines vs. pyrimidines?
11. Explain Mitosis and all the stages involved
12. How is Mitosis different from Meiosis?
13. Explain what is cloning?
14. Who is “Dolly” and the significance of Dolly to genetics
15. What is the difference between a gene and an allele?
16. What do genes determine?
17. How do genes produce their effect?
18. Explain genotype
19. Explain phenotype
20. What is a chromosome? How many chromosomes do humans have?
21. What is the function of the mitochondria?
22. Explain the difference between mitochondrial DNA vs. Nuclear DNA
23. [What is the Human Genome Project?](#) Give a brief explanation
24. [What are introns vs. exons?](#)
25. [Explain polymorphism](#)
26. [What is DNA Fingerprinting?](#)
27. What are restriction enzymes? How do these help with DNA analysis?
28. What is gel electrophoresis?
29. How do scientists analyze to determine if a DNA sample is from the same person, related, people, or non-related people?
30. Explain DNA typing and identification
31. What is RFLP and what is its significance to genetics and forensics?
32. What is VNTR and what is its significance to genetics?

33. Briefly explain the principles of PCR
34. What is STR DNA? How is this significant in forensic science?
35. Explain what VNTR is and how this is used in forensic science.
36. Briefly explain why population genetics is important in the study of forensic science
37. What is the difference between individual vs. trace evidence?
38. Explain how is DNA tested in Crime Labs?
39. How is DNA extracted from follicular tags?
40. Are fingerprints unique to each individual?
41. Do identical twins have the same fingerprints? Why or why not?
42. How is DNA extracted from blood? Explain the process and be specific as to which type of blood cell.
43. Why did Kary Mullis receive the Nobel prize in 1993?
44. What is CODIS and how is this significant for the field of forensics?
45. What is epigenetics?
46. What is molecular genealogy?
47. What are transgenic organisms? Explain the significance of these organisms to our world today.

These are some websites to help you to get started:

- [Genetic Science Learning Center](http://learn.genetics.utah.edu/) <http://learn.genetics.utah.edu/>
- [How DNA Evidence Works](http://science.howstuffworks.com/genetic-science/dna-evidence.htm) <http://science.howstuffworks.com/genetic-science/dna-evidence.htm>
- [DNA Typing](http://caligula.bcs.deakin.edu.au/bcs_courses/forensic/Chemical%20Detective/DNA_Type.htm) http://caligula.bcs.deakin.edu.au/bcs_courses/forensic/Chemical%20Detective/DNA_Type.htm
- [DNA Typing and Identification](#)
- [Library of Parliament](http://www.parl.gc.ca/information/library/PRBpubs/bp443-e.htm#GLOSSARY(txt)) [http://www.parl.gc.ca/information/library/PRBpubs/bp443-e.htm#GLOSSARY\(txt\)](http://www.parl.gc.ca/information/library/PRBpubs/bp443-e.htm#GLOSSARY(txt))
- [Dolan DNA Learning Center](http://www.dnalc.org/resources/animations/index.html) <http://www.dnalc.org/resources/animations/index.html>
- [Human Genome Project](http://www.ornl.gov/sci/techresources/Human_Genome/elsi/forensics.shtml) http://www.ornl.gov/sci/techresources/Human_Genome/elsi/forensics.shtml
- [Gel electrophoresis \(* try the virtual lab!!!\)](http://learn.genetics.utah.edu/content/labs/gel/) <http://learn.genetics.utah.edu/content/labs/gel/>
- [RFLP's](http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/R/RFLPs.html) <http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/R/RFLPs.html>
- [Principles of PCR](http://learn.genetics.utah.edu/content/labs/pcr/) (you should check out the virtual lab as well!!) <http://learn.genetics.utah.edu/content/labs/pcr/>
- [STR DNA](http://www.cstl.nist.gov/biotech/strbase/) <http://www.cstl.nist.gov/biotech/strbase/>
- [Mitochondrial DNA](http://www.fbi.gov/hq/lab/fsc/backissu/july1999/dnalist.htm) <http://www.fbi.gov/hq/lab/fsc/backissu/july1999/dnalist.htm>
- [How DNA is Tested in Crime Labs](http://www.seattlepi.com/dayart/20040722/DNAtesting.pdf) <http://www.seattlepi.com/dayart/20040722/DNAtesting.pdf>

Georgia Performance Standards

SFS3. Students will analyze the use of toxicology, serology, and DNA technology in forensic investigations.

Compare short tandem repeat patterns (STR) and relate to identifying the DNA of an individual. Explain the use of the DNA database for DNA profiling.