The Bandit's Bad Hair Day

Student Activity

Name _____

Class _____

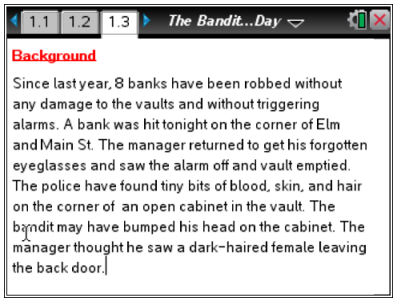
Open the TI-Nspire document *The_Bandits_Bad_Hair_Day.tns.*

A string of strange bank robberies have left authorities stymied. No forced entry, alarms are working perfectly…how is this possible? You will play the role of a Forensic DNA Analyst tasked with helping authorities capture the PHANTOM BANDIT! This bank robber is like nothing they've seen before but one mistake may be the break that is needed. Use your skills to isolate DNA from a few strands of hair left at the latest bank heist to track down the Phantom!

Move to pages 1.2—1.4.

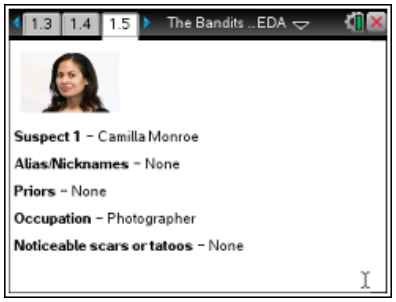
1. Pages 1.2 to 1.4 describe a scenario where the FBI and local authorities have detained possible suspects involved in a series of bank robberies.

2. Read through the background information to look for clues in the case.



Move to pages 1.5–1.9.

3. Read the profiles of each of the suspects and then answer the question on page 1.10.



Move to pages 1.10. Answer the question here and/or in the .tns file.

Q1. Choose who you believe may be guilty based on their picture and profile.

Move to pages 1.11 to 1.14.

4. These pages will describe what RESTRICTION ENZYMES do to DNA.

Move to pages 1.15 – 1.16. Read the directions for the simulation.

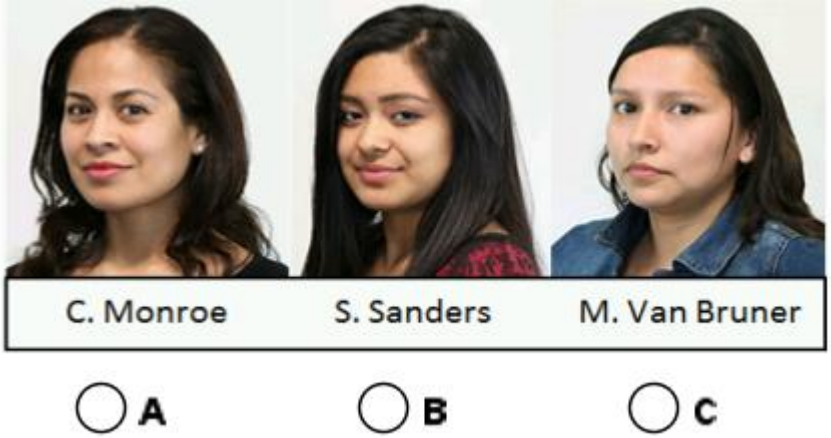
5. The simulation is of a gel electrophoresis chamber with negative and positive electrodes. These electrodes will guide the fragments of DNA from the crime scene evidence and the suspects through the gel.

Move to pages 1.18–1.34. Answer questions here and/or in the .tns file.

Q2. In gel electrophoresis, why does the DNA move?

Q3. Increasing the voltage across the gel causes the DNA to migrate slower.

Q4. Based on the DNA evidence, choose the suspect you believe likely committed the crime.



Q5. Bias can complicate the facts of a case. Did you exhibit bias when you selected the "guilty" suspect before looking at the DNA evidence?

A. Yes
B. No

Q6. What were some reasons for choosing the suspect you chose?

Q7. Reversing the voltage causes the DNA to move in the opposite direction.

A. True
B. False

Q8. The longer the electric current runs through the gel, the further the DNA migrates.

A. True
B. False

Q9. If the gel runs too long, the DNA…

A. collects at the end of the gel.
B. runs off the end of the gel.
C. stays in the same position.
D. evaporates.

Q10. Which DNA sequence would have a palindrome on its opposite strand?

A. ATAAAT
B. AAGCTT
C. TAGGAT
D. CAAGTG

Q11. Why do you think WHITE blood cells are used for DNA evidence when blood is found at a crime scene? Why are RED blood cells not as useful??

Q12. In a sentence, what is the most important part of the job of a Forensic DNA Analyst?

Q13. What could happen if a Forensic DNA Analyst gets it wrong?

Q14. What would be the most rewarding part of a being a Forensic DNA Analyst?

Q15. Based on the context of the use of the word, "arraignment," which of the following descriptions most likely fits best?

A. court hearing to assign punishment to the perpetrator

B. court hearing to officially charge the defendant with a crime. A plea is entered

C. court case where the prosecutor and defense attorney make their cases to a jury

Q16. DNA evidence will ALWAYS determine guilt or innocence in a case. Do you agree or disagree? Why?