

Biology Unit 3: Genetics

The Case of the Hooded Murderer

Name _____

Date _____ Per _____

Lord Robert Lancaster's body—with a long dagger protruding from the chest—lay sprawled in his library. A draft of Lord Robert's new will, which would have disinherited his family and left his vast fortune to charity, was still on his desk. The will was not signed and so his nieces and nephews would inherit his money and property.

The Lancasters were a large, wealthy British family. Lord Robert's brothers and sisters had all died before him, and he never married. But he was scarcely alone. His twelve nieces and nephews had moved into the houses on the family estate.

One of the police officers who came to investigate the murder was Inspector Watson, a shrewd sleuth who had once planned to be a biologist. His special interest was genetics, and he was particularly interested in the Lancaster murder because of certain patterns of inherited traits in the family.

As Watson explained to Holmes, "Old Lord Peter (Lord Robert's father) is shown in that portrait over the fireplace. As a young man he had bright red hair. His wife, Violet, was a brunette. Half their children, including the late Lord Robert, had red hair; the others were brunettes. As only a recessive pair of genes (aa) will produce brown hair, each of Lord Peter's children received an a gene from him."

Watson went on, "We know Lady Violet had A genes because she was a brunette, and even one A gene will produce brown hair. But Lady Violet must have been heterozygous (Aa) because half her children had red hair."

In questioning the family and servants, Inspector Watson found a witness to the murder, a maid who had heard a groan from the library. Afraid to go in, she had pepped through the keyhole and seen someone in a long, hooded cape. "I couldn't even tell whether it was a man or a woman, sir. But I did see a bit of red hair sticking out from under the hood. The person had a nervous habit of pulling on one ear lobe, which I noticed was not an attached ear lobe."

"Aha!" said Watson. "Ear lobes, also, own their attachment to one pair of genes. A person who is homozygous dominant (EE) or heterozygous (Ee) has free ear lobes, and someone who is homozygous recessive (ee) has attached ear lobes."

The inspector began drawing up a chart of the Lancaster family, using portraits and family albums. Some information was not available, but he learned three important pieces of information. First, old Lord Peter Lancaster had free ear lobes. Second, Lady Violet had attached ear lobes. Third, some of their children had attached ear lobes.

By a strange coincidence, Lord Robert's brothers and sisters had all married persons having attached ear lobes.

Unfortunately, no pictures of the suspects were available, and Inspector Watson had not yet met them in person. The servants could not remember whether the suspects had free or attached ear lobes, but of course they knew which had red hair and which were brunettes. Inspector Watson added that information to the chart.

Below is the chart Inspector Watson made up. Using the information in the chart, you should be able to correctly identify the murderer.

WHO MURDERED LORD ROBERT? _____

Parents

Children & Spouses

Grandchildren

