

Practice: Interpreting DNA Fingerprints

Name _____

Date _____ Period _____

A Paternity Case

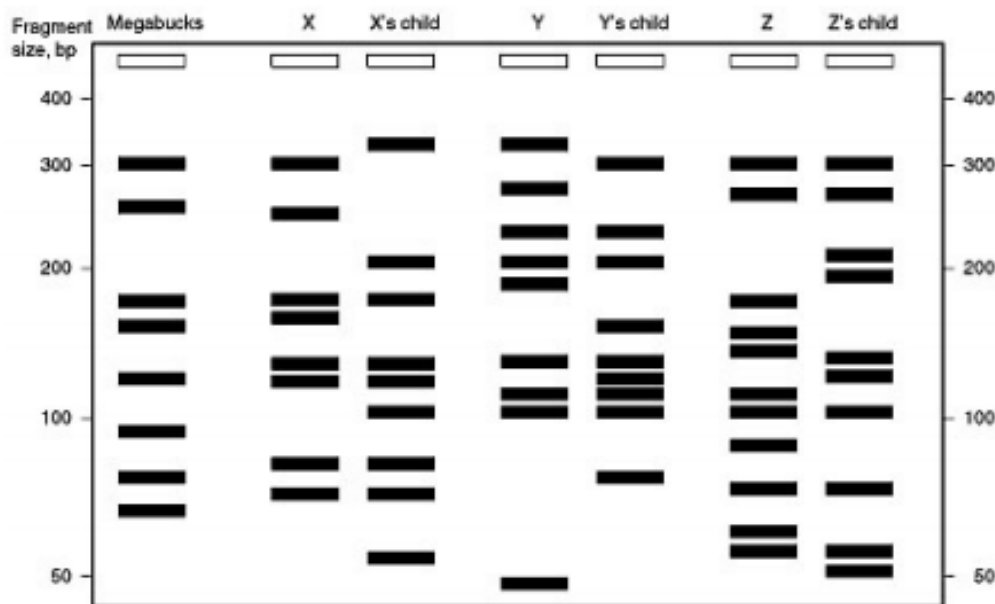
Mr. I. M. Megabucks, the wealthiest man in the world, has recently died. Since his death, three women have come forward. Each woman claims to have a child by Megabucks and demands a substantial share in his estate for her child. Lawyers for the estate have insisted on DNA typing of each of the alleged heirs. Fortunately, Megabucks anticipated trouble like this before he died, and arranged to have a sample of his blood frozen away for DNA typing.

Remember that every person has two of each chromosome, one inherited from his mother and one from his father. Therefore, half of the children's DNA bands will come from their mother, and the other from their father. The question is, could that father be Megabucks?

1. For the first child, identify the bands in the DNA profile that came from the mother and mark them with an **M**. Circle the remaining bands.

2. Compare the remaining bands with the DNA profile from Megabucks. If he is the father, then all of the circled bands in the child's profile should have a corresponding band in his profile. Use a straight edge to help you line the bands up accurately. (Remember that only half of the father's chromosomes are transmitted to a child, so not every band from the father would match the child's profile).

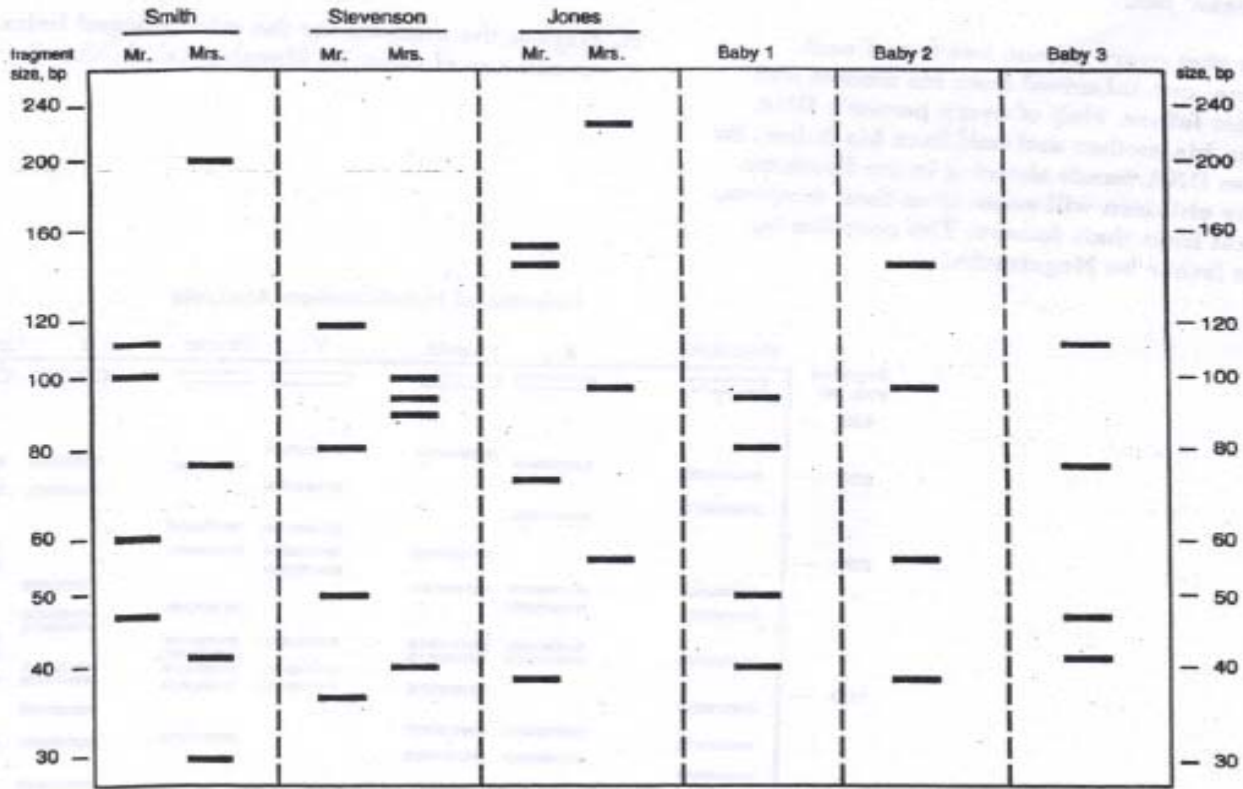
3. Repeat the analysis for the other alleged heirs. Could any of them be Megabucks' children?



A Mix-up at the Hospital

On June 6 at approximately 1:00 pm, Mrs. Smith, Mrs. Stevenson, and Mrs. Jones each delivered a healthy baby boy at Metropolitan General Hospital. At 1:20 pm, the hospital's fire alarm sounded. Nurses and orderlies scrambled to evacuate patients. The three new babies were rushed to safety. After the danger had passed, the hospital staff was distressed to find that in the confusion, they had forgotten which baby was which! Since the babies were rescued before receiving their identification bracelets, there was no easy way to identify them. Dr. Anne Robinson, head of pediatrics, ordered that DNA typing be performed on the babies and their parents. The DNA typing laboratory looked at two different highly variable chromosome regions. The DNA profiles are shown below. Your job is to decide which baby belongs to which set of parents. To assign a baby to a set of parents, every band in the baby's profile should match a band from either the mother or the father. Not all of the bands in the mother's or father's profiles will have a counterpart in the baby's DNA profile. Hint: Use a ruler or straight edge to help you line up the bands.

Which baby belongs to which couple? Show which bands each baby inherited from its mother and from its father by marking them with "M" and "F".



Challenge

Results from this DNA fingerprint analysis for a man and his four different children are shown in the figure. Which lane (1-5) contains the DNA of the father? How do you know?

