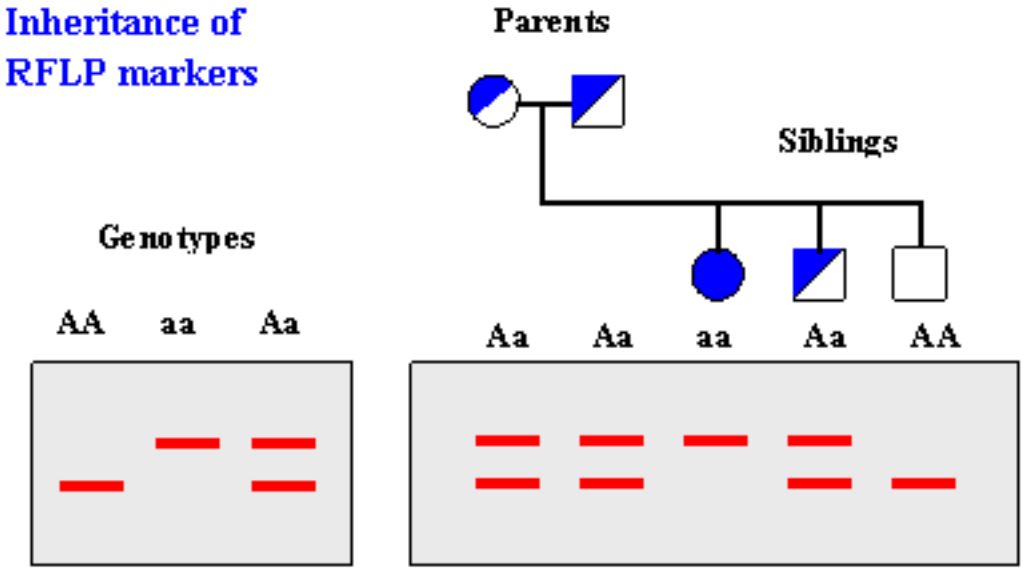
CONCEPT: MAPPING WITH MARKERS

- Mapping with _____ attempts to link chromosomal regions without the need to link alleles
  - □ A **molecular marker** is a small DNA segment that has unique identifiable properties
    - Can be **polymorphic**, meaning that they can differ between individuals in a population
    - Very useful in identifying location of unknown genes, with unknown alleles
  - □ **Restriction fragment length polymorphisms (RFLPs)** occurs when DNA from individuals are cut differently
    - Different lengths are due to slight differences in the DNA that are recognized by restriction enzymes
      - Due to: mutations, deletions, duplications, etc…
    - RFLPs are obtains by taking an individuals DNA, cutting it, and then comparing lengths on a gel or blot
  - □ RFLPs can be mapped through crosses and analysis of _____ phenotypes
    - Exactly the same as linkage mapping, but instead of looking at phenotypes, scientists look at DNA
    - Generates an **RFLP map**, which is a linkage map of RFLP markers in the genome of an organism

EXAMPLE:



□ **Microsatellites** are short tandem repetitive sequences that can also be used as markers to _____ the genome

- A CA repeat of 5-50 is found repeated about every 10,000 bases

- PCR is used to identify the length and position of the microsatellites in the organisms or genomic region

- Like RFLPs, microsatellites can be followed through crosses and offspring production to map

PRACTICE:

1. What is a molecular marker?
    a. A fluorescent probe attached to regions of a chromosome
    b. A gene of interest
    c. A small DNA segment with unique properties
    d. A fluorescent protein that marks regions of the cell

2. Which of the following markers is not useful for mapping genes?
    a. Restriction fragment length polymorphisms
    b. Microsatellites
    c. Single Nucleotide Polymorphisms
    d. Enhancers