

*RFLP LEARNING ASSESSMENT
CHECKING FOR UNDERSTANDING
TEACHER GUIDE*

One of the simplest ways to collect large amounts of DNA for analysis is from cells found in the elephant's dung. This is exactly what Wasser and Comstock and other scientists use for their DNA analysis of elephant families and individuals.

Below, you are given two sections of DNA that represent segments from elephants. Using what you know about BamHI, RFLPs and electrophoresis, **cut the following DNA segments, and tape/glue the pieces (according to how they would electrophorese) to the picture of the gel on the following page. Answer the questions.**

Dung Pile X

TAAAGGATCCCCTAGCTAGGATCCTATATACCATATACGAG
ATTCCTAGGGGATCGATCCTAGGATATATGGTATATGCTC

Dung Pile Y

TAAAGGATCCCCTATATACCCGAGGTACCAGGATCCTAGTC
ATTCCTAGGGGATATATGGGCTCCATGGTCCTAGGATCAG



RFLP ASSESSMENT

NAME _____

PERIOD _____ DATE _____

<div style="border: 1px solid black; display: inline-block; padding: 5px; margin-bottom: 10px;">Dung Pile X</div> <p style="text-align: center;">GATCCTATATACCATATACGAG GATATATGGTATATGCTC</p> <p style="text-align: center;">GATCCCCTAGCTAG GGGATCGATCCTAG</p> <p style="text-align: center;">TAAAG ATTTCTAG</p>	<div style="border: 1px solid black; display: inline-block; padding: 5px; margin-bottom: 10px;">Dung Pile Y</div> <p style="text-align: center;">GATCCCCTATATACCCGAGGTACCAG GGGATATATGGGCTCCATGGTCCTAG</p> <p style="text-align: center;">GATCCTAGTC GATCAG</p> <p style="text-align: center;">TAAAG ATTTCTAG</p>
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1. Compare and contrast the banding patterns between X and Y.
Both samples show three bands. The smallest band is the same in both samples, but they differ in the sizes of the other bands.
2. How many restriction sites does each linear DNA sample have? *X has 2, Y has 2*
3. Explain why the two dung piles have different DNA banding patterns using the concept of RFLPs.
They have different patterns because the inherited DNA sequences are different, and the restriction sites may be in different places. Consequently, when BamHI cuts the linear DNA, the fragments vary in size, and therefore move different distances through the gel.
4. If the elephants are sisters, what might we expect to see in their RFLP patterns?
They might have patterns that are very similar because they are related and would have the same parents. However, the patterns would not appear exactly the same because each individual has their own unique polymorphisms, and will show their own unique banding pattern.
5. Predict what you would expect to see if the elephants are NOT related?
They might have some bands in common because they are the same species, but many bands would be different because they have different parents.

