



SeaWorld/Busch Gardens Genetics

4-8 Classroom Activities

Gel Electrophoresis

OBJECTIVE

- The student will identify the importance of genetically distinct breeding.
- The student will compare and contrast several gel electrophoresis plates to determine breeding pairs of rhinos.
- The student will define the process of gel electrophoresis and its role in endangered animal breeding programs.

ACTION

1. Explain to students that they are in charge of helping protect several endangered rhinos. It is their responsibility to make sure the rhinos are genetically distinct from one another. This will help prevent inbreeding and produce healthy offspring.
2. Give each student a copy of the rhino gel electrophoresis sheet.
3. Explain how gel electrophoresis is used to separate the proteins in blood and that no two individuals will have the exact same pattern produced. However, related individuals will have similar patterns. The rhino gel electrophoresis sheet has six copies of rhino gel plates that correspond to the rhinos currently under their care. It is the students' responsibility to compare these six gel plates to one another. (To compare, students may cut plates into strips.) Next, the students will determine which rhinos are the most genetically distinct from one another and therefore should be placed in a breeding program together. This is accomplished by distinguishing which rhinos have the least number of bars on the gel plate in common.
4. Compare answers as a class.

ANSWERS

Rhinos 1 and 3, 2 and 5, and 4 and 6 are most compatible together (least number of bars in the gel plate in common).

VOCABULARY

gel-electrophoresis: Separation of nucleic acids or proteins, on the basis of their size and electric charge, by measuring their rate of movement through an electric field in a gel.

genetics: The science of heredity; the study of heritable information.

gene: One of many discrete units of hereditary information located on the chromosomes and consisting of DNA.

protein: A three-dimensional biological polymer constructed from a set of 20 different monomers called amino acids.

MATERIALS

For each student:

- rhino gel electrophoresis sheet (color copy recommended)
- pencil

For class:

- copy of Teacher's Guide



Healthy offspring from genetically distinct parents have a better chance of survival.

rhino gel electrophoresis sheet

rhino 1 rhino 2 rhino 3 rhino 4 rhino 5 rhino 6

	blue	cyan		red	gray
		cyan	magenta	red	
green	blue		magenta		
green			magenta		gray
				red	gray
green	blue		magenta		
		cyan	magenta	red	
		cyan		red	gray
green			magenta		
green	blue				gray
green	blue	cyan	magenta		
		cyan		red	
	blue	cyan			
green	blue		magenta		
green	blue		magenta		
		cyan		red	gray
	blue	cyan	magenta		
		cyan		red	gray
green				red	
	blue		magenta		