



# SeaWorld/Busch Gardens Genetics

## 4-8 Classroom Activities

### Rhino Genetics

#### OBJECTIVE

The student will utilize basic genetic principles to select for a desired trait.

#### ACTION

1. Divide the class into 5 or 6 equal groups.
2. Place the “Rhino Hereditary Story” on the overhead projector and read the story aloud.
3. Instruct students that each team has 20 minutes to answer the following questions based on the story. At the end of the 20 minutes, the class will go over the solution. (A separate transparency may be used to work on the solution with the class.)

#### ANSWER KEY

1. What is Barney's, Betty's, and Molly's genotype? Molly= pp; Barney=Pp; Betty=Pp
2. Is the elongated prehensile lip trait dominant or recessive? Why?  
The elongated prehensile lip trait must be recessive because in order for the offspring (Molly) to express the trait and neither parent (Barney or Betty) expresses the trait, that means that each parent has an allele for the elongated prehensile lip trait in their genome. However, in the presence of another allele (a dominant allele) the trait is not expressed (as in the case with the parents). A recessive allele can only be expressed phenotypically if there are two identical copies of the recessive allele (as in the case with the offspring Molly).
3. What is the percent probability that Fred and Molly's baby would also have this trait?  
100% probability that Fred and Molly's offspring will have the elongated lip because in order for both parents to express the trait, they must have homozygous recessive genotypes. Since both parents have two recessive alleles for the trait, there is no possibility that a dominant allele can be expressed.
4. Circle all of the following that have homozygous genotypes:  
Molly, Fred, and Jenny have homozygous genotypes.
5. Circle all of the following that have heterozygous genotypes:  
Barney, Betty, and Jed have heterozygous genotypes.

## VOCABULARY

allele: Alternative form of a gene.

dominant: An allele that determines phenotype even when heterozygous.

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.

heterozygous: Having two different alleles for a given trait.

homozygous: Having two identical alleles for a given trait.

monohybrid Cross: A breeding experiment that employs parental varieties differing in a single character.

prehensile: Capable of grasping or holding.

recessive: An allele that is not expressed in the heterozygous condition.

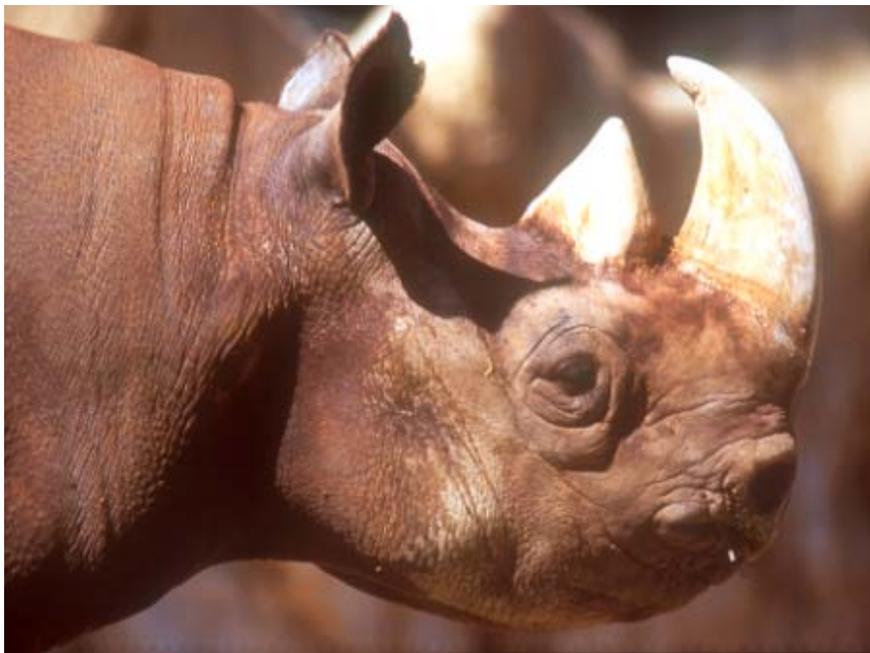
## MATERIALS

### For each student:

- two sheets of paper
- pencil

### For class:

- overhead projector
- transparency marker
- “Rhino Hereditary Story” copied onto a transparency for the overhead projector



The size of a rhino's flexible prehensile lip is trait passed from parents to offspring.

## Rhino Hereditary Story

You are a wildlife biologist. During your time in Africa, you observed a particular family of rhinos. This family unit has a calf with a unique trait. Black rhinos normally have a prehensile lip used to grasp vegetation. However, this baby (whom you have been calling Molly) has an extra long prehensile lip and it enables her to be even more efficient at browsing than the usual prehensile lip. You have observed that neither of her parents (Barney and Betty) have this elongated prehensile lip. This trait is particularly interesting because you are in charge of a breeding survival program with XYZ zoo. If you could breed black rhinos with this extra long prehensile lip trait, they would have a better chance of surviving in the wild.

### Questions

1. What is Barney's, Betty's, and Molly's genotype?

Barney \_\_\_\_\_ Betty \_\_\_\_\_ Molly \_\_\_\_\_

2. Is the elongated prehensile lip trait dominant or recessive? Why?

3. When Molly becomes old enough, you would like her to mate with a male named Fred who also has this extra long prehensile lip trait. Fred's mom (Jenny) also has the elongated lip trait, but his father (Jed) does not. What is the percent probability that Fred and Molly's baby would also have this trait?

4. Circle all of the following that have homozygous genotypes:

Barney      Betty      Molly      Fred      Jed      Jenny

5. Circle all of the following that have heterozygous genotypes:

Barney      Betty      Molly      Fred      Jed      Jenny