

Name: _____

Black Rhino Case Study (*Diceros bicornis*)

You are a wildlife biologist researching black rhinos. During your time in Africa, you have observed two particular traits that allow some black rhinos to be better adapted to their environment. The first trait is an extra-long prehensile lip that enables the rhino to have more efficient browsing capability than the usual size prehensile lip. Second, some of the rhinos in the study have extra-long ears that allow them to hear a potential predator earlier than rhinos with normal size ears. If you could breed black rhinos that have both these traits (extra-long prehensile lip and bigger ears), it would increase their chance for survival in the wild.

You have chosen the following two rhinos to enter into a breeding program for the two desired phenotypic traits. It has been determined (based on your previous research) that both the desired traits are homozygous recessive.

Parent 1:

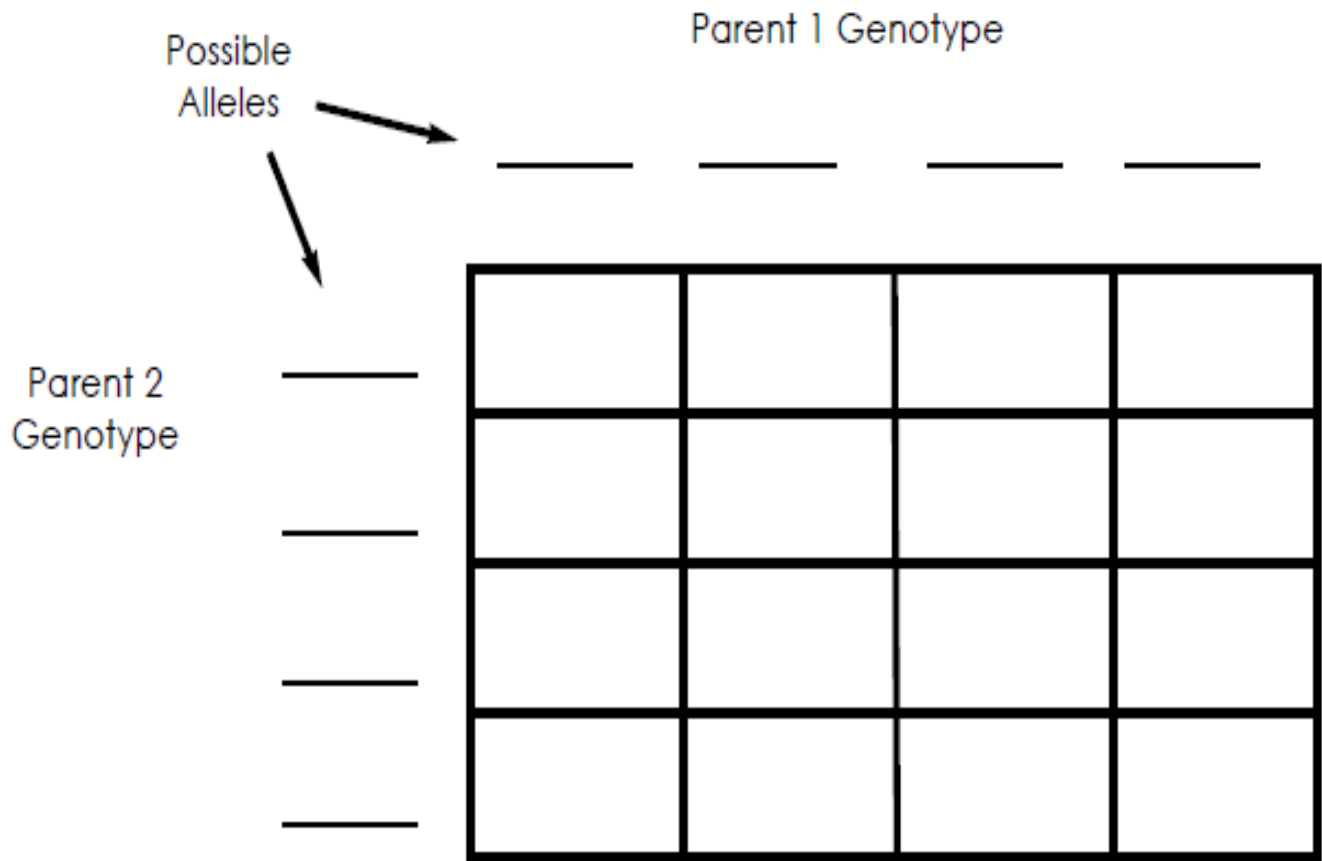
Homozygous dominant for the prehensile lip trait (PP). Therefore this parent does not express the extra-long lip trait.

Heterozygous for the longer ear trait (Ee). Therefore this parent does not express the extra-large ear trait.

Parent 2:

Heterozygous for the prehensile lip trait (Pp). Therefore this parent does not express the extra-long lip trait.

Homozygous recessive for the large eared trait (ee). Therefore the parent does express the extra-long ear trait.



Questions:

1. Determine the possible genotype (s) that will produce individuals without an extra-long lip trait and do not express the extra-large ear trait. What is the frequency that each of these genotype(s) occur in the dihybrid cross?
2. Determine the possible genotype (s) that will produce individuals that have a normal lip and the extra-large ears? What is the frequency that each of these genotype (s) occur in the dihybrid cross?
3. How many rhinos can be produced with the extra-long lip and large ear trait from the two parents crossed above? Explain your answer.
4. What is the ratio between rhinos that have normal prehensile lips and ears to those that have the normal lip but extra-large ears? (Normal lip and ears: Normal lip and extra-large ears).