

In dogs, there is a hereditary deafness caused by a recessive allele, "d". A kennel owner has a male dog that she wants to use for breeding purposes if possible. The dog can hear, so the owner knows his genotype is either  $DD$  or  $Dd$ . If the dog's genotype is  $Dd$ , the owner does not wish to use him for breeding so that the deafness gene will not be passed on. This can be tested by breeding the dog to a deaf female ( $dd$ ). Draw the Punnett squares to illustrate the two possible crosses that would result from mating this male with a homozygous recessive female. In each case, what percentage/how many of the offspring would be expected to be hearing? deaf? How could you use the offspring of such a breed to determine the genotype of this male dog?

		male				male	
		$D$	$d$			$D$	$D$
female	$d$	$Dd$	$dd$	female	$d$	$Dd$	$Dd$
	$d$	$Dd$	$dd$		$d$	$Dd$	$Dd$

$\text{10 puppies:}$   
 likely at least 1  
 dog will be deaf

$\text{10 puppies:}$   
 all hearing

## Alien Genetics Activity:

- ① Determine 10 characteristics that are genetic for a made-up space alien (CLASS)
- ② You and a partner will each determine the genetic makeup for one parent (INDIVIDUALLY)
- ③ You and your partner will make Punnett Squares that show all possible outcomes of a mating between your creatures (5 PUNNETT SQUARES EACH)
- ④ You and your partner will randomly determine the alleles your alien offspring will have & draw a picture (YOU + PARTNER ONE PICTURE)

## Objectives:

- Students will practice using Punnett Squares
- Students will practice correctly using genetics vocabulary to describe the genotype and phenotype of parents and offspring
- Students will be able to explain how parental genotype and heredity can predict the potential phenotype of offspring

## New Vocabulary for Alien Genetics Activity:

**Trait:** A measurable or observable characteristic of an organism (often genetically determined)

**Phenotype:** An organism's appearance with respect to a certain gene

**Genotype:** An organism's alleles for a certain gene

trait	genotype	Phenotype
Yellow/green peas	$Yy$	Yellow peas
Yellow/green peas	$YY$	Yellow peas
Eye color	$BB$	Brown eyes
Eye color	$bb$	Blue eyes