

Extra Review Practice – Biology Test Genetics

Mendel fill in the blanks:

Mendel was an Austrian monk who studied genetics primarily using _____ plants. He started with plants that produced offspring with only one form of a trait; these were called true or _____ breeding plants. Through breeding two pure plants with different phenotypes, like tall and short, he discovered how traits could skip _____ and how _____ alleles could get masked.

One of the things Mendel discovered was the Law of _____. This law states that alleles of a gene separate from each other during _____ so only one allele for a particular gene is in each _____ cell.

Another thing Mendel noticed is that when he crossed peas with two contrasting forms of the trait, for example tall vs. short and round vs. wrinkled, the inheritance of one trait didn't influence the inheritance of the other. So the other law that Mendel discovered was the Law of _____. This law states that the inheritance of one trait does not have to determine the trait of another, for example his tall pea plants didn't always have to have round seeds also.

Generations	Pea	Recessive	Pure
Segregation	Meiosis	Gamete	Independent Assortment

Monohybrid Crosses and Basics

Fill in the blanks below:

Every person has ___ chromosomes that contain many genes. _____ are different versions of a gene and based on which ones you inherit certain traits will be expressed. The _____ of an organism represents its' genetic composition (the alleles you actually inherit), the _____ of an organism reflects all the traits that are actually expressed (what you physically see). You have two alleles for each trait, if you have two dominant alleles you are _____, if you have two recessive alleles you are _____, if you have two different alleles you are _____. In simple genetic problems someone who is heterozygous will show the _____ trait because it masks the recessive allele. When studying the inheritance of alleles a _____ cross involves one trait or gene, while a _____ cross involves studying two genes or traits at the same time.

Homozygous Dominant	Alleles	Phenotype	Heterozygous
Dihybrid	Homozygous Recessive	Genotype	Dominant
Monohybrid	46		

Create monohybrid crosses that study height in pea plants. Tall pea plants (T) are dominant to short (t) pea plants.

1. Set up a cross between two heterozygous parents. Show the Punnett square below then answer the following questions:

- a. What is the genotypic ratio:
 - b. What is the phenotypic ratio:
 - c. What percent chance will the offspring be tall?
 - d. What percent chance would the offspring be homozygous dominant?
 - e. What percent change would the offspring be heterozygous?
2. Set up a cross between a heterozygous parent and a homozygous recessive parent. Show the Punnett square below then answer the following questions:

- a. What is the genotypic ratio:
- b. What is the phenotypic ratio:
- c. What percent chance will the offspring be tall?
- d. What percent chance would the offspring be homozygous dominant?
- e. How many different phenotypes are possible between these parents?
- f. How many different genotypes are possible between these parents?

3. If two parents are carriers for a disorder, what does that mean about their genotype? What does it mean about the disorder? What is the likelihood that even though they don't express the disorder their child would?

Dihybrid Crosses and Exceptions to Mendel

1. When creating a dihybrid cross you are actually studying two traits at once, however offspring will only inherit one allele from each parent. If a parent has the following genotype, what are the different combinations of that could be passed on to their offspring: DdGg
2. If tall is dominant (T) over short (t) and Yellow (Y) is dominant over green (y), examine the following cross:

Parental Generation: Male - TtYy x Female – TtYy

	TY	Ty	tY	ty
TY				
Ty	A			
tY			B	
ty				

- a. What do the parents look like?
 - b. What is the phenotypic ratio of the offspring?
 - c. What is the genotype of the box with an "A" in it?
 - d. What is the genotype of the box with a "B" in it?
3. Match the following using the word bank below:
 - a. When organisms who are heterozygous show a blended phenotype the trait is
 - b. When organisms who are heterozygous show both forms of a trait
 - c. Controlled by multiple alleles in humans
 - d. Color blindness and hemophilia are caused by genes on the X chromosome, so they are
 - e. Sex linked traits are more likely to be found in what gender
 - f. Carriers are people who have this genotype
 - g. If someone is a carrier for a disease, the disease must be
 - h. When more than one gene controls a trait it is

Co-dominant	Blood type	Sex linked	Polygenetic
Heterozygous	Recessive	Male	Incomplete Dominant

Mutations

1. Mark the following as true or false:
 - a. Mutations can be inherited, environmentally caused or happen during replication
 - b. Everyone has lots of hidden recessive mutations that are not always expressed or harmful
 - c. Cells have efficient systems for correcting errors to prevent mutations (think G1 and G2 check points in mitosis)
 - d. Hemophilia, cystic fibrosis and sickle cell anemia are all caused by genes that code for defective proteins

Pedigrees

1. If a trait shows up equally in males and females on a pedigree that means it is most likely what type of trait?
2. If a trait shows up more often in males than in females on a pedigree that means it is most likely what type of trait?
3. If everyone who shows a trait on a pedigree has a parent who also shows it, it is most likely what type of trait?
4. If a child has a trait on a pedigree but their parents don't or are only half shaded in, it must be what type of trait?
5. In a pedigree where a circle or square is half shaded on that person is a _____, and if it is fully shaded in that person actually _____ the disorder or trait.
6. **Don't forget to practice using the pedigree on the review sheet!**

Vocabulary

_____ This is the study of heredity, aka the unit we are studying

_____ This is the passing of traits from parents to offspring

_____ This is a segment of DNA that carries the instructions for a specific gene/protein

A change in a gene due to damage or being copied incorrectly

This is the process of creating sex cells, it is also when alleles separate to be passed on to offspring