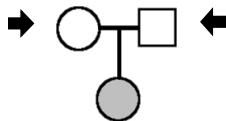


## Genetics Vocabulary

### Allele

Any of the different forms a gene can take that produce different manifestations of a trait. Each allele is on a separate chromosome. Alleles are usually symbolized by a single letter of the alphabet, with capital and lower-case letters representing the two alleles. *Humans have two alleles for each gene – one from each parent.*

### Carrier



An individual who shows no (visible) signs of a trait, but who carries a recessive allele for the trait. *Since hemophilia runs in her family, Sara is having genetic testing to see if she's a carrier before she has children.*

### Chromosome



A length of DNA, bundled and folded into a compact shape. In organisms that result from sexual reproduction, half of the chromosomes contain the mother's genetic material, and half contain the father's. Humans have 42 chromosomes, two of which are sex chromosomes. *People who have Down's Syndrome have three copies of chromosome number 21.*

### Codominance

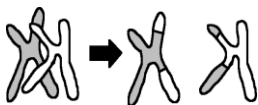


When two (or more) alleles are expressed equally throughout the organism. Neither is dominant and neither is recessive. *Codominance is often seen in flowers, such as when red and white roses produce offspring that is pink.*

### Cross

As a verb, short for cross-breed: to mate two organisms with different traits, whether experimentally, or to create some advantageous result in the offspring. As a noun, an instance of cross-breeding.

### Crossing over



During prophase of meiosis I, paired chromosomes can trade parts where the chromosomes touch each other. This process leads to new combinations of genetic material. *Crossing over is one way that asexually produced offspring can have different traits than their parents.*

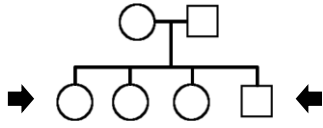
### Dominant



The trait that will be expressed when two different alleles of a gene are present. *Curly hair is dominant over straight, so if one parent has curly hair, the children will have curly hair.*



## Filial generation



The offspring from a cross. The first generation is referred to as F1. The products of a cross within the F1 generation are called F2, and so on. *The first filial generation didn't express the recessive trait, but their offspring, F2, were all homozygous recessive.*

## Gene

A piece of DNA that codes for a single trait or protein. A gene is the smallest length of chromosome that cannot be broken by recombination (crossing over). *Each chromosome has the sequencing for thousands of genes along its length.*

## Gene expression



The steps through which a gene goes from being a sequence of DNA to being expressed as structures in an organism. *Gene expression varies between individuals, so the same gene can result in different structures.*

## Genome



An organism's genetic material. The DNA sequence from all chromosomes, and any other sources of DNA (e.g. mitochondria). *The Human Genome Project is a group of scientists trying to find the DNA sequence for the entire human genome.*

## Genotype

An organism's genetic makeup for a specific trait. Genotype names all the alleles for a trait, even if only one of them is expressed. *I don't know if my genotype is Bb or BB, but my phenotype is brown eyes.*

## Heterozygous

Having two different alleles for a trait, such as being Bb for brown eyes. *My parents have dimples when they smile, but I don't. They must both be heterozygous for dimples.*

## Homologous chromosomes



A pair of chromosomes that both code for the same characteristics. In humans, the 46 chromosomes are organized by scientists into 22 sets of homologous chromosomes, plus the two sex chromosomes. One of each pair was inherited from each parent.

## Homozygous

Having two identical alleles for a trait, such as being AA (homozygous dominant) or aa (homozygous recessive) for attached earlobes. *I don't have a widow's peak, so I must be homozygous recessive.*

## Hybrid



The product of a cross between two genetically unlike organisms. The resulting organism is often sterile. *A mule is a hybrid since it's the result of a cross between a donkey and a horse.*



## Hybrid vigour



The tendency of crosses between two genetically unlike organisms to result in offspring that are bigger and healthier than either parent. Many plants exhibit this trait, and this characteristic has been exploited in developing most crop-bearing plants. *Hybrid vigour accounts for why this corn plant (middle) produces larger ears of corn than either of its parents (right and left).*

## Incomplete dominance



When two alleles are dominant in different parts of the organism. *A cat with alleles for a black coat and a white coat might have a white coat in some places, and a black coat in others. This is incomplete dominance.*

## Linked genes

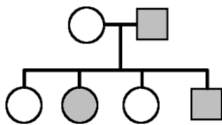


Traits that are commonly inherited together. Linked genes are close together on the same chromosome and are rarely separated from each other by crossing over. Skin and hair color are linked genes. Although these traits are inherited separately, they are commonly found in patterns – blondes with pale skin, and brunettes with medium to dark skin.

## Monohybrid cross

A cross between organisms that have two different alleles at a particular gene to test for dominance in a single trait ( $AA \times aa$ ). *The monohybrid cross showed that long stems are the dominant trait for these roses.*

## Pedigree



A diagram showing the pattern of inheritance for a trait within a family. Females are shown as circles, males are squares. The shapes of those who inherited the trait being studied are shaded. *For this assignment I have to draw pedigrees showing the inheritance of three traits in my family.*

## Phenotype

The actual expressed trait, such as having curly hair. *Since we both have brown eyes, Fred and I have the same phenotype. We may have different genotypes, however.*

## Pleiotropy



When a single gene controls several characteristics. *Albinos exhibit pleiotropy because the gene for albinism affects hair colour, skin colour, and eye colour.*



### Polygenic inheritance



When multiple genes or factors control a single characteristic, such as human height. *In order for someone to have red hair, they must have both the gene for no hair color (not blonde, brown, or black) and the gene for redness, since red hair exhibits polygenic inheritance.*

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### Recessive



An allele that isn't expressed when the second allele is different from it. *A person with one allele for green eyes and one for brown eyes will have brown eyes because green is recessive and brown is dominant.*

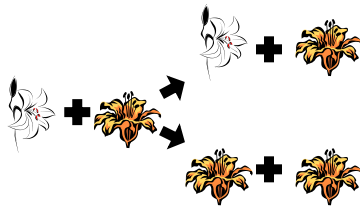
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### Sex-linked gene

A gene located on a sex chromosome. Since males inherit an X and a Y chromosome, they receive only one copy of the genetic code on these chromosomes. If there is a gene for a recessive trait on either of these chromosomes, 100% of male offspring will inherit the trait. *Sex-linked genes are responsible for a number of genetic disorders that are more common in males than females, such as muscular dystrophy and colour blindness.*

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### Test cross



Crossing an organism (usually a plant) that has a dominant phenotype with another that is homozygous recessive to reveal the genotype of the dominant plant. Offspring that are 100% dominant show that the dominant parent is homozygous dominant. If half of the offspring is dominant and half is recessive, then the dominant parent is heterozygous. *The results of the test cross demonstrated that this lily is heterozygous for both colour and height.*

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### True breeding



An organism (usually a plant) that, when self-fertilized, will have offspring with the same traits as the parent. For a plant to be true breeding, it must be homozygous in all of its alleles since a heterozygote would have both homozygous and heterozygous offspring. *True breeding flowers are more expensive, but we can be sure that any seedlings will look just the same as the parent.*

