

Punnett Square

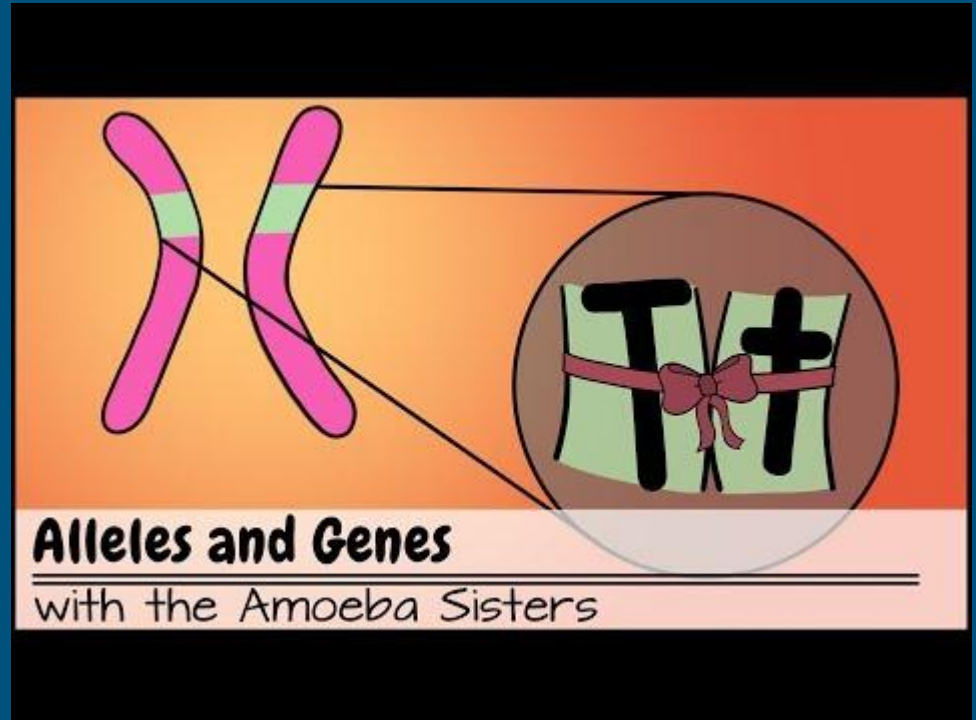
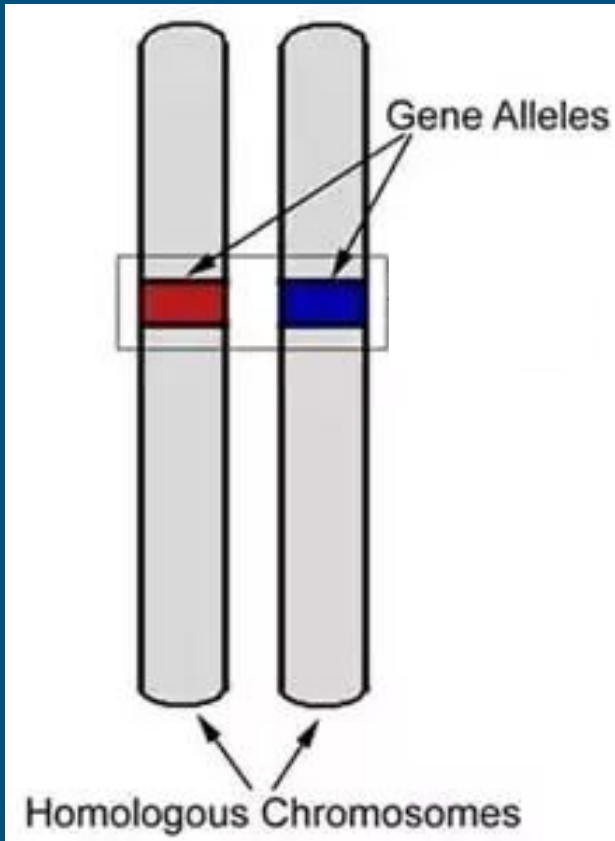


	A	A
a	Aa	Aa
a	Aa	Aa

Genetics



Alleles and genes



Mendel and the Gene Hypothesis

Gregor Mendel (1822-1884), an Austrian monk, noted that observing three generations of a family showed patterns of inheritance.

He grew pea plants for 10 years as one of his duties in the monastery in Czech Republic. This is where he observed patterns in a very large sample size.

He examined characteristics such as flower colour (purple or white), height (tall or short), pea shape (round or wrinkled).

P- purple/ p- white

T-tall/ t-short

R-round/ r-wrinkled

Mendel's Conclusions

1. The presence of different alleles is responsible for the variation in the appearance of the organism.
2. An organism always has two genes present for each characteristic-one inherited from each parent.
3. If the alleles on both of the genes are the same, then the organism is purebred.
4. If the two alleles are different, then the organism is a hybrid for a characteristic such as flower colour. One trait will be dominant and one will be recessive.

Genotype Summary

Genotype	Gene Combination	Description
Homozygous	PP or pp	organism with matching alleles
Homozygous dominant	PP	organism with matching dominant alleles
Homozygous recessive	pp	organism with recessive alleles
Heterozygous	Pp	organism whose alleles are not the same (hybrid)

Punnett Squares

-allow one to study Mendelian inheritance

	<i>T</i>	<i>t</i>
<i>T</i>		
<i>t</i>		

	T	t
T	TT	Tt
t	Tt	tt

-two heterozygous parents are crossed

T-tall
t-short

Tt x Tt

Offspring

Genotypic ratio is 1:2:1

















Phenotypic ratio is 3:1

Practice!

Dihybrid Cross

9:3:3:1

• $RrYy \times RrYy$

	RY	Ry	rY	ry
RY	 RRYY	 RRYy	 RrYY	 RrYy
Ry	 RRYy	 RRyy	 RrYy	 Rryy
rY	 RrYY	 RrYy	 rrYY	 rrYy
ry	 RrYy	 Rryy	 rrYy	 rryy



Genetic Series - Video 1

Monohybrid Crosses
With the Amoeba Sisters

- Both videos start with monohybrid crosses.

Practice!

Incomplete Dominance

-hybrid genotype expresses a mixture of traits displayed by its purebred parents

-example: carnations- red (RR), pink (RW) and white (WW)

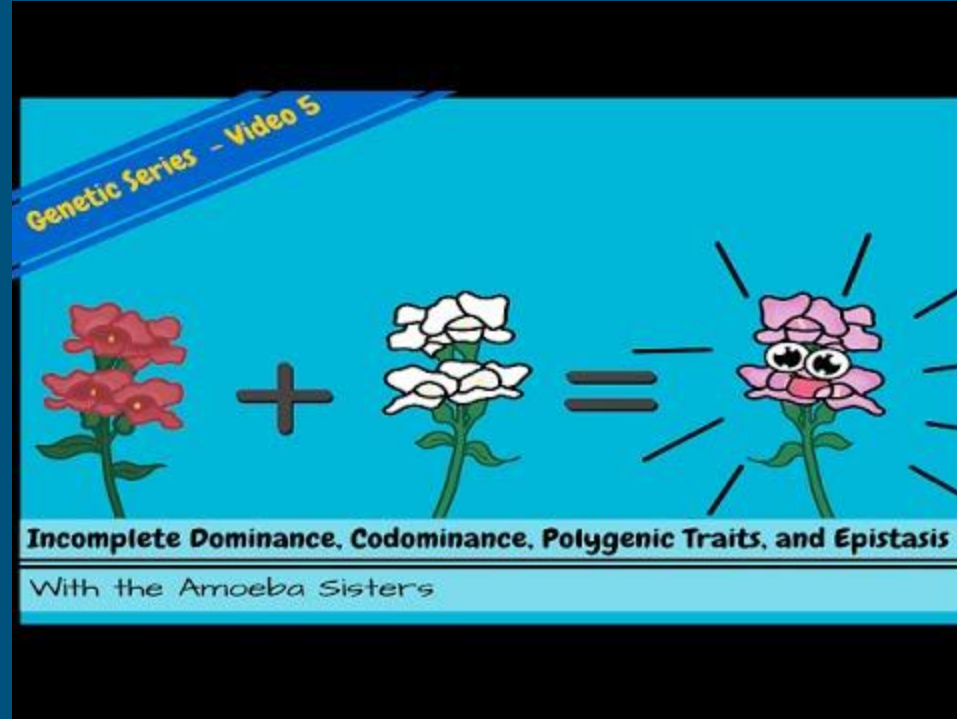
-red = 2 alleles for red

-white = 2 alleles for white

-pink = 1 allele for red, 1 allele for

white...mix = pink!

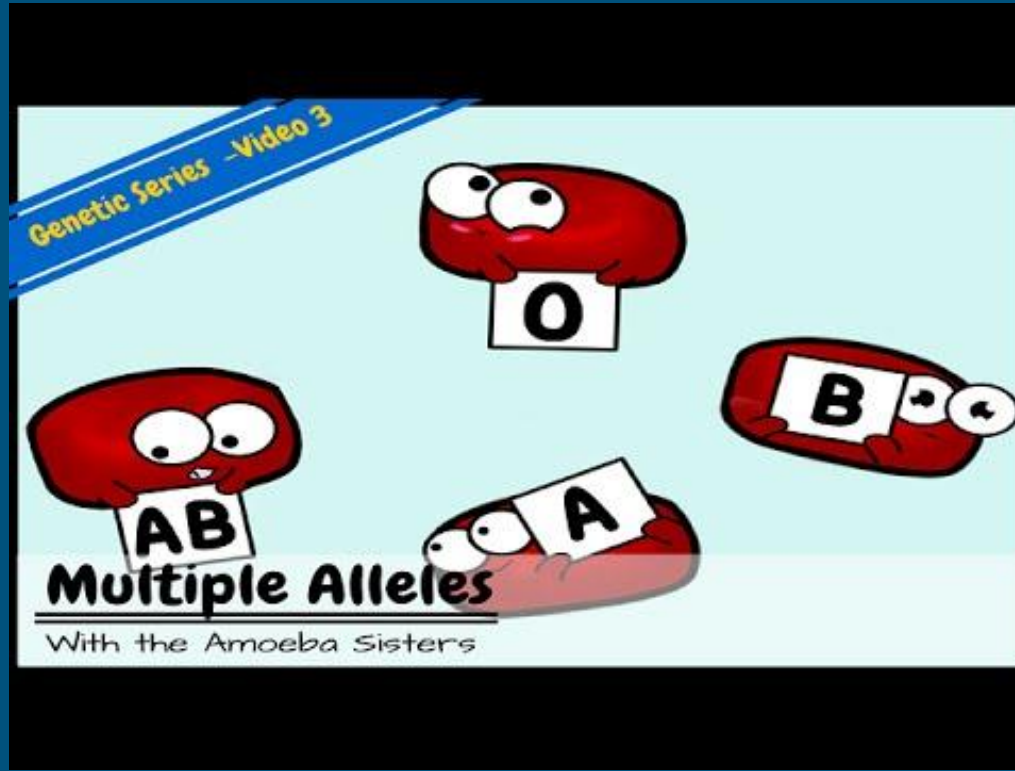
Practice!



Codominance

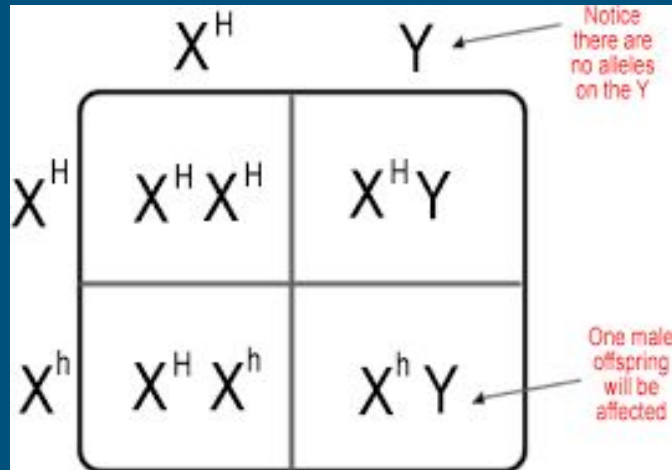
- both traits for a characteristic are completely expressed in the hybrid
- example- Human blood types, ABO blood typing system
- AB blood cells have both A and B antibodies (proteins) on their surface

Practice!



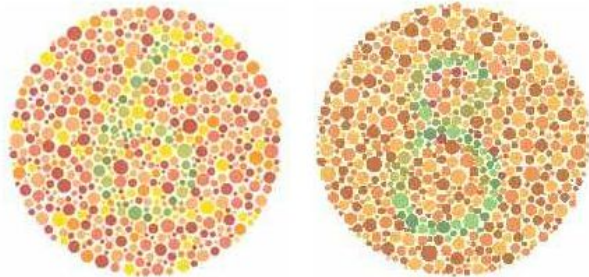
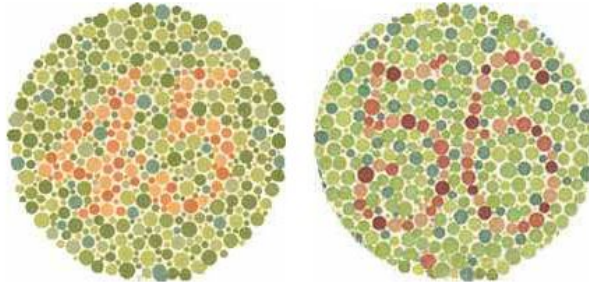
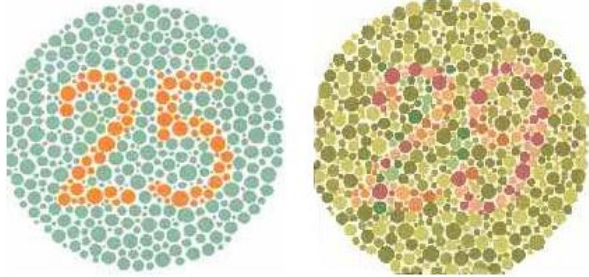
Sex-Linked Traits

There are some genes located on the sex chromosomes. These are called sex-linked genes. The pattern of inheritance is called sex linkage. Human examples include colour blindness and haemophilia, Duchenne Muscular Dystrophy .

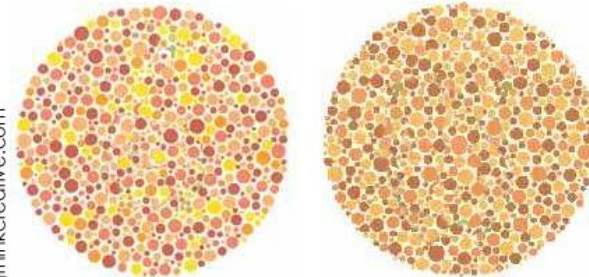
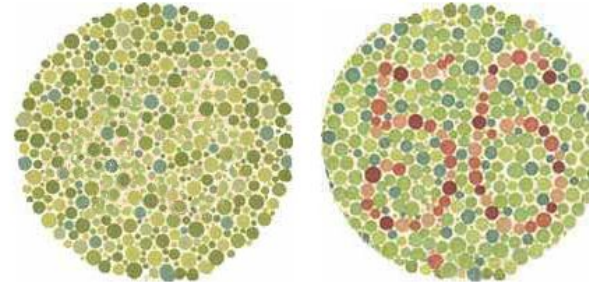
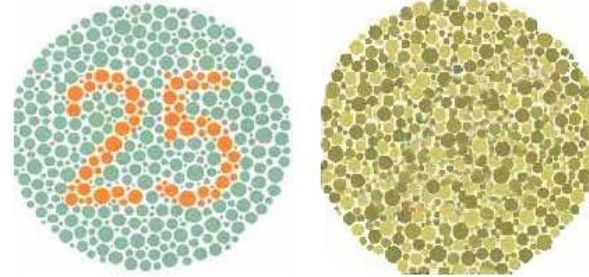


Ishihara Test For Color Blindness

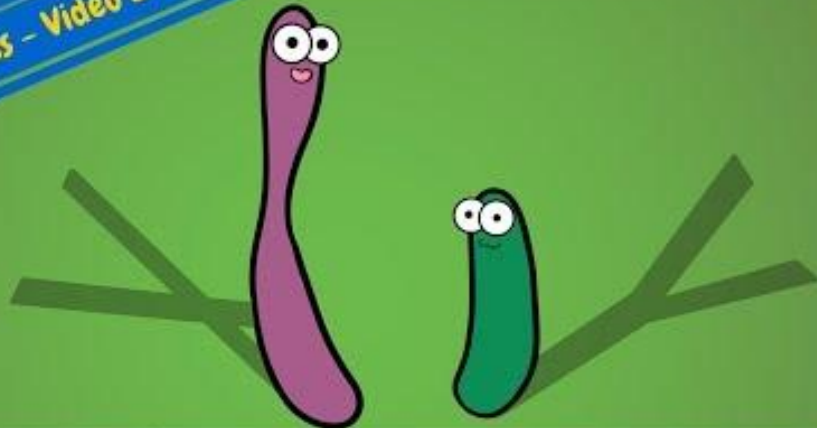
What People With Regular Vision See



What Red-Green Color Blind People See



Genetic Series - Video 2



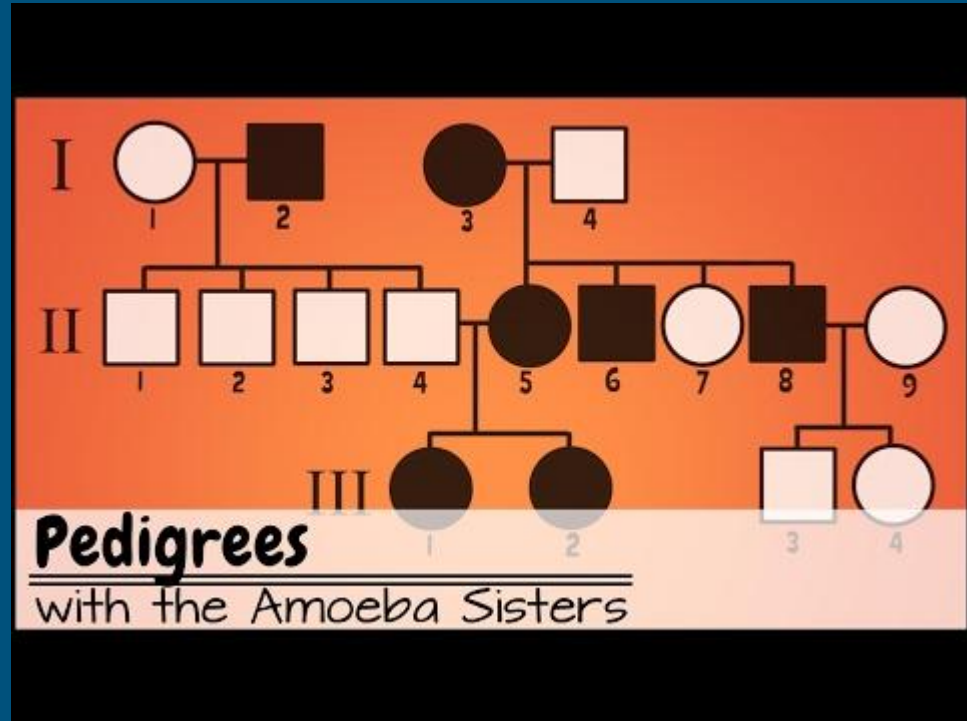
Sex-Linked Traits

with the Amoeba Sisters

Practice!

Pedigrees

- These charts can be used to track the dispersal of traits over multiple generations of family.



Height Genes

0 1 2 3 4 5 6

or seven

Multiple Genes

Genetic Series - Video 4

	HS	Hs	hS	hs
hs	HhSs	Hhss	hhSs	hhss
hs	HhSs	Hhss	hhSs	hhss
hs	HhSs	Hhss	hhSs	hhss
hs	HhSs	Hhss	hhSs	hhss

Dihybrid Crosses
With the Amoeba Sisters

Practice!

Review

- The Test for this section will include the first three note sets from Genetics