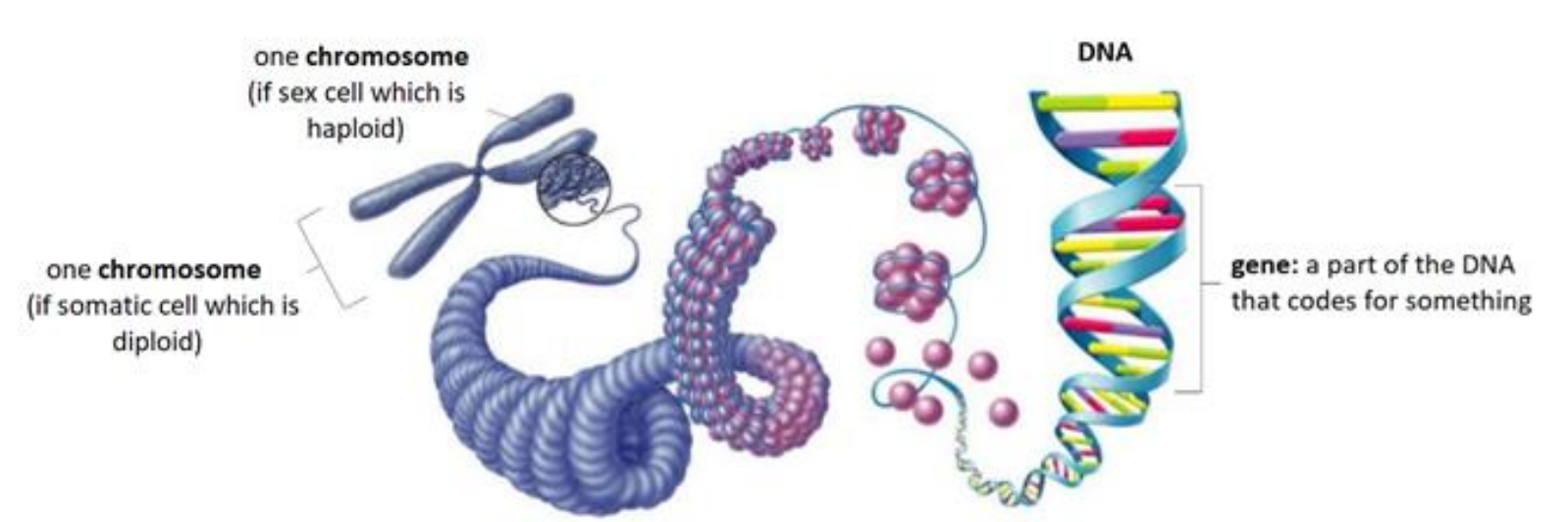
Inheritance

Basic Mendelian Genetics

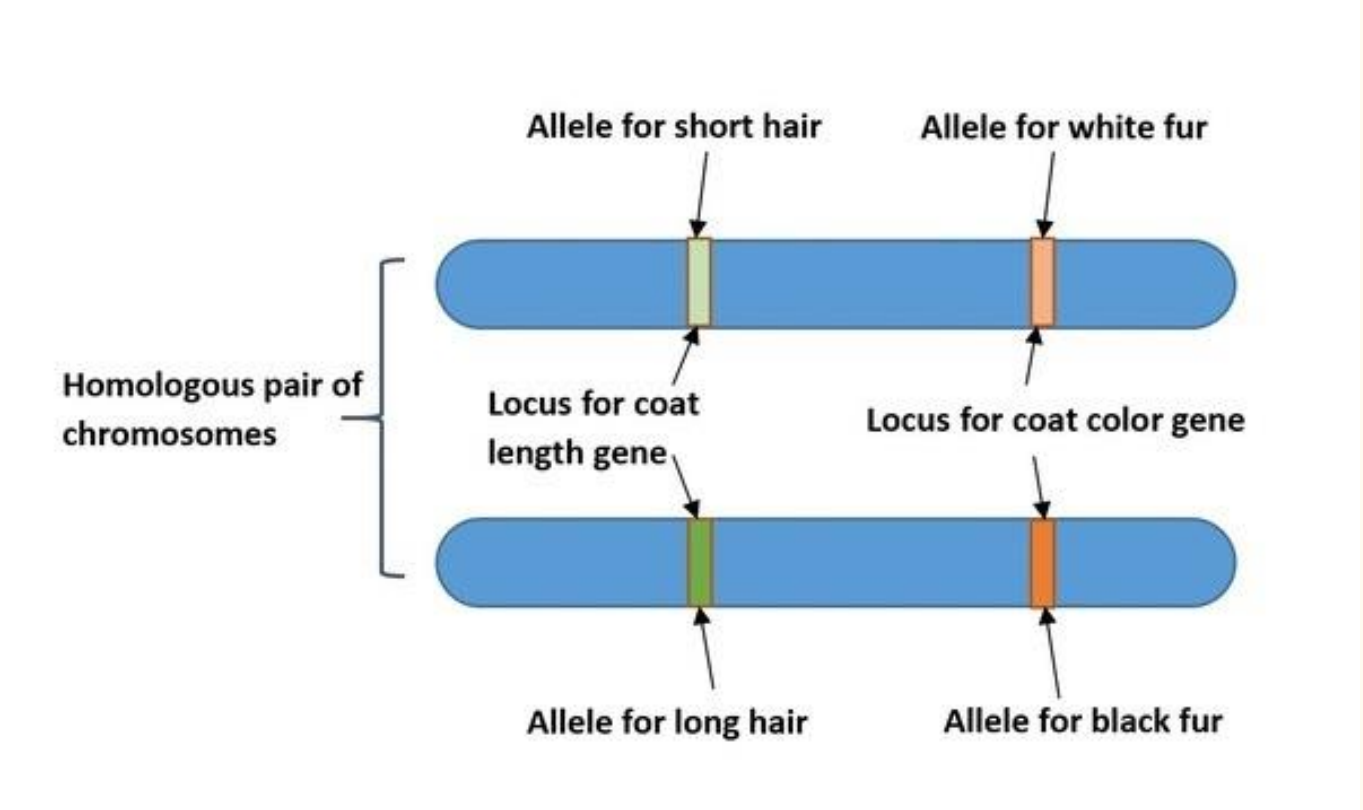
A little throwback here...

- Proteins determine many traits in an organism
- Proteins are created from DNA
- Parts of DNA that code for proteins are called genes



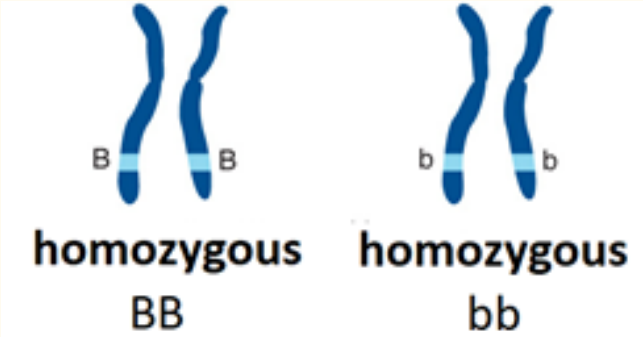
Humans have 23 pairs of chromosomes. The 23rd pair is the XX for females and XY for males.

Any gene can have multiple versions, called alleles.

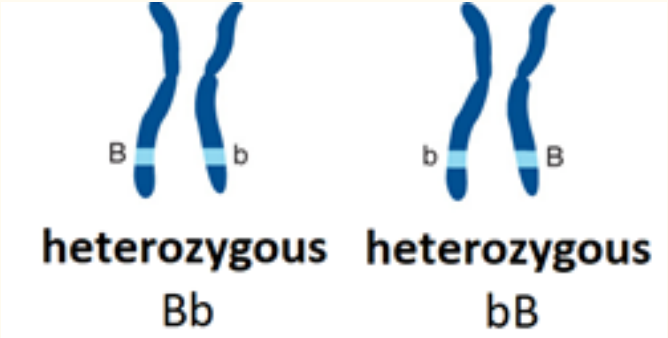


Homozygous vs. Heterozygous

If a homologous pair of chromosomes carries two copies of the same allele.



If a homologous pair of chromosomes carries two different alleles.



Who came up with this nifty idea?

THIS STUD!

Gregor Mendel was an Austrian monk and biologist who loved to garden

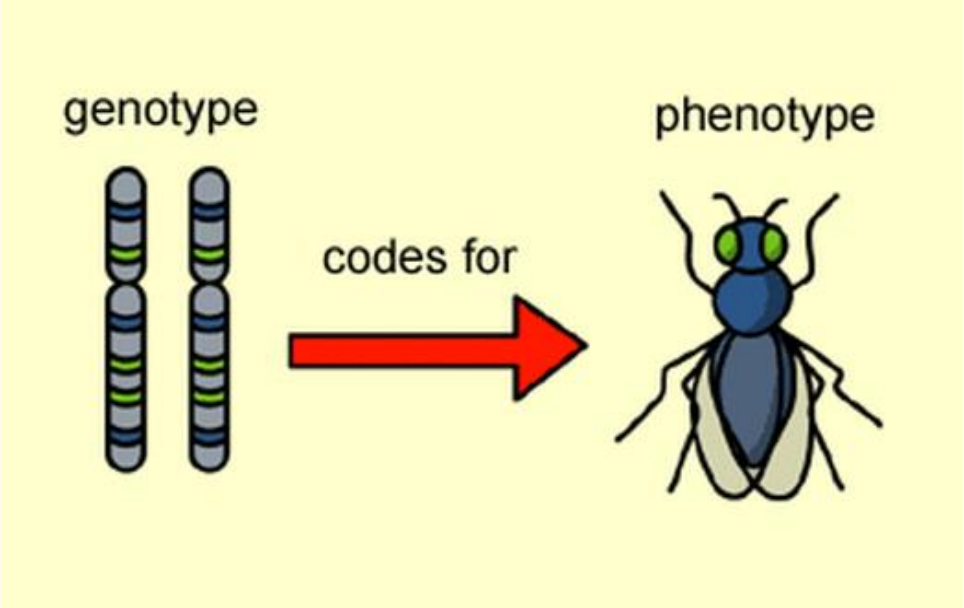
He did experiments on pea plants in the 1850's, and discovered the rules of heredity.

Watch this...

https://www.youtube.com/watch?v=Mehz7tCxjSE

Genotype vs. Phenotype

The set of alleles of an organism.

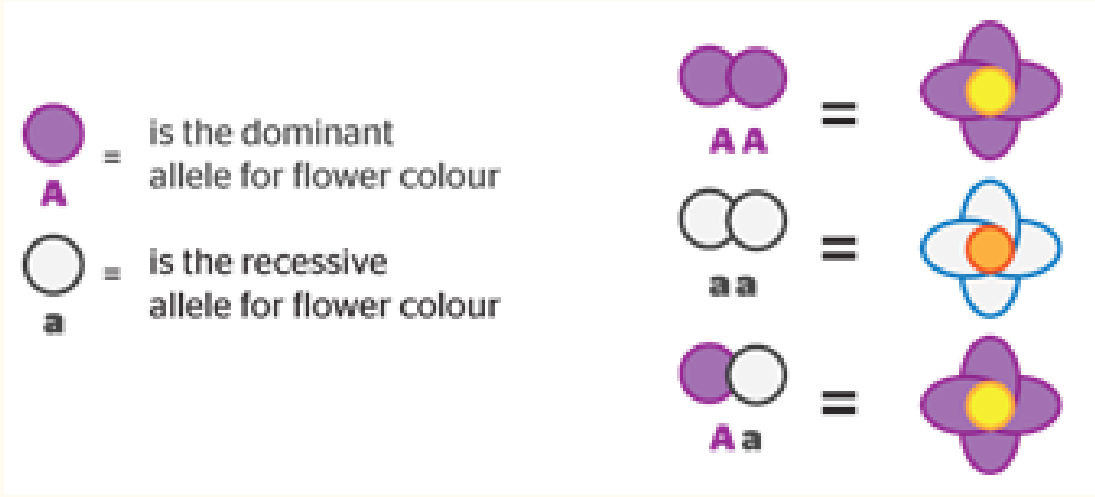


The physical and physiological traits of an organism. (Observable characteristics)

Dominant vs. Recessive

An allele that is fully expressed in the phenotype of a heterozygote.

The symbol is a capital letter.

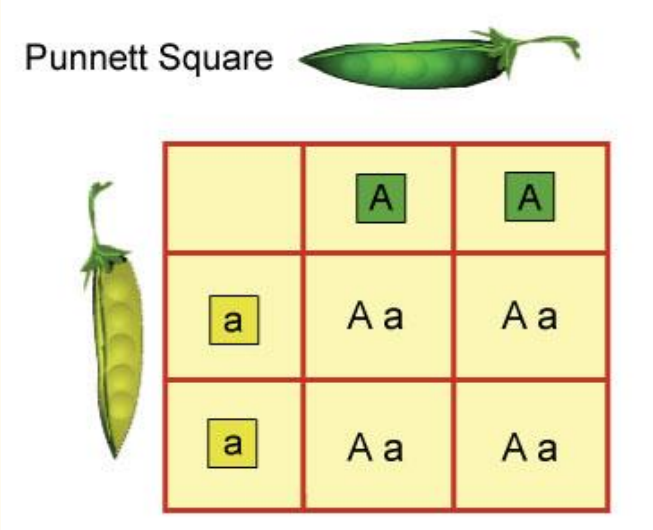


An allele whose phenotypic effect is not observed in heterozygotes.

The symbol is a lowercase letter.

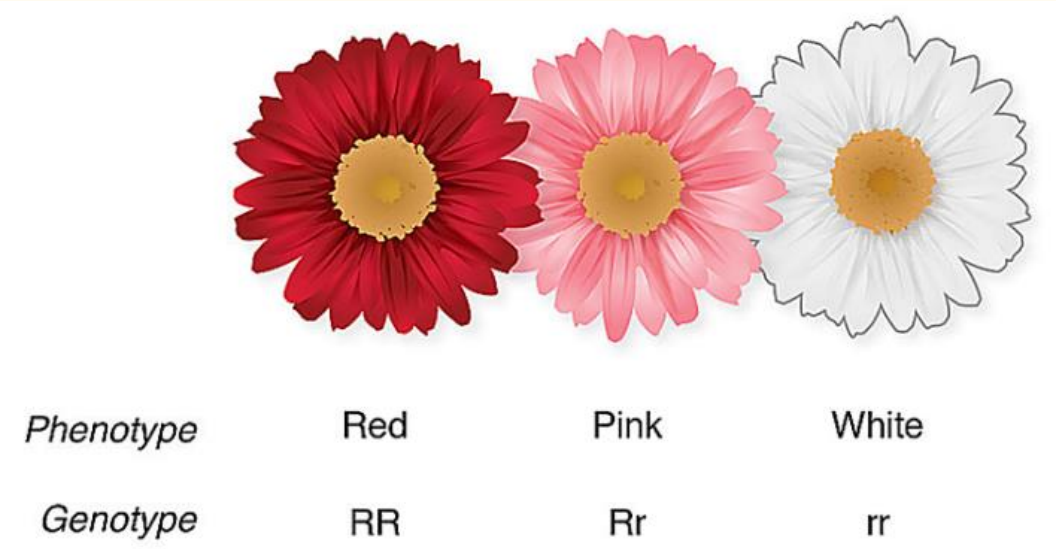
Punnett Squares

- A diagram that helps predict the outcome of an offspring.
- A MONOHYBRID Punnett Square only looks at one locus, and therefore only one phenotype.
- Try the ones on your sheet!



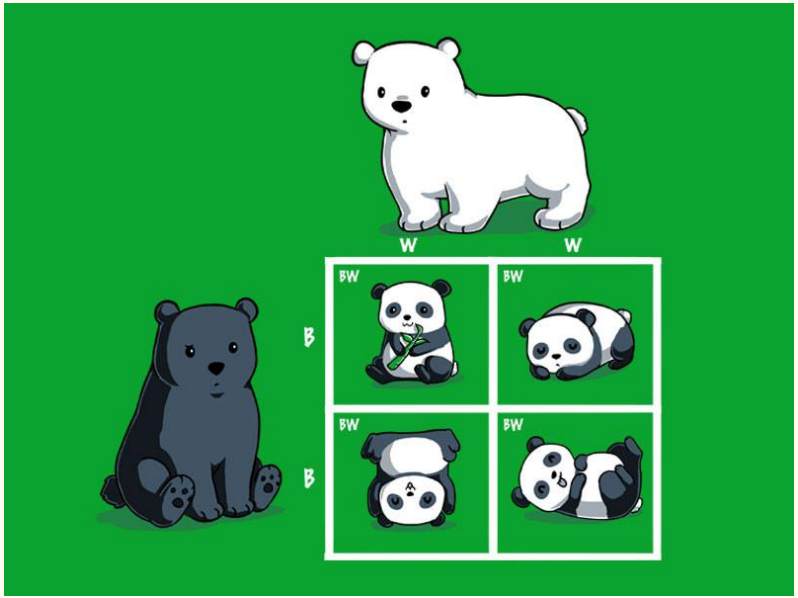
Incomplete Dominance

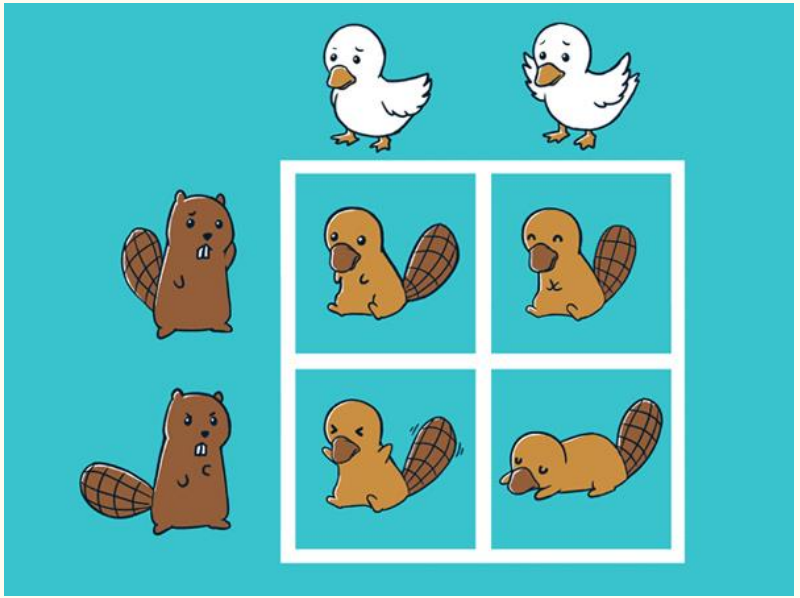
- The phenotype of heterozygotes is an intermediate (mix) between the dominant and recessive phenotypes.
- Try the ones on your sheet!



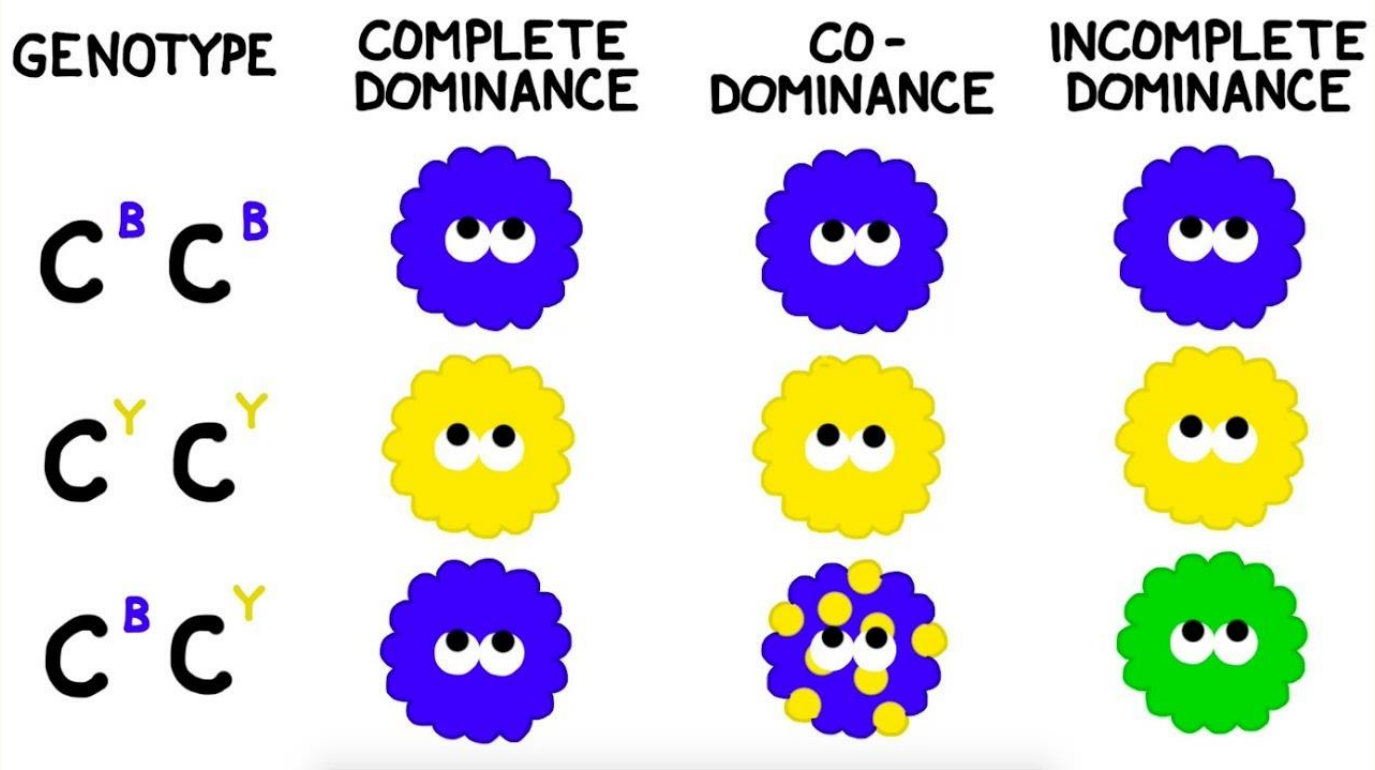
Codominance

- When both alleles of a heterozygote are fully expressed
- This causes the offspring to be neither dominant nor recessive.
- Try the ones on your sheet!



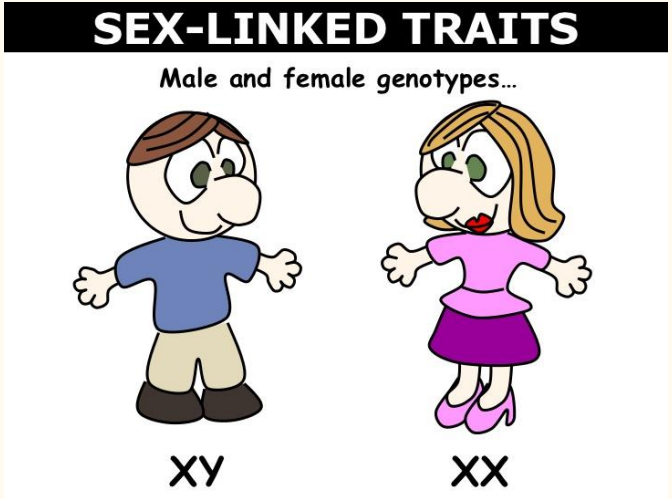


SUMMARY


GENOTYPE
COMPLETE DOMINANCE
CO-DOMINANCE
INCOMPLETE DOMINANCE
$C^B C^B$
$C^Y C^Y$
$C^B C^Y$

Sex-Linked Inheritance

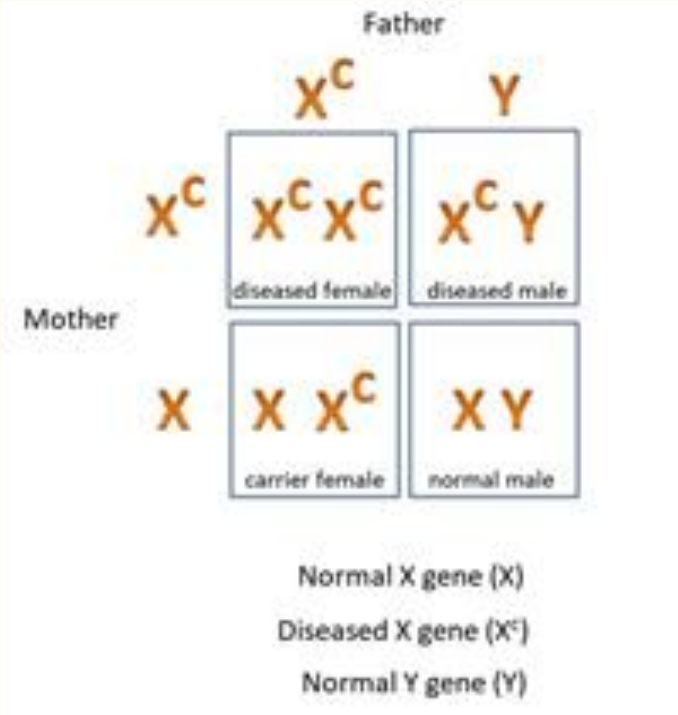
- When a gene is carried on the sex chromosomes, X and Y
- Some traits passed from mother (XX), and some from father (XY)



https://www.youtube.com/watch?v=h2xufrHWG3E

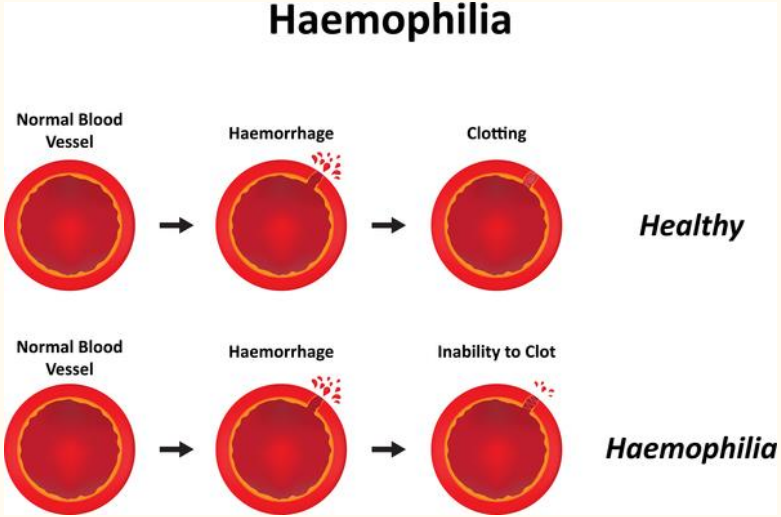
Another example...

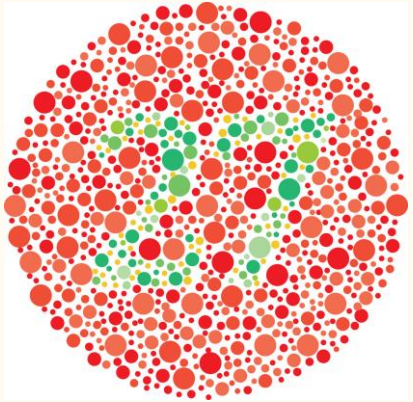
- A dominant mutation occurs on a gene that is only carried by the X chromosome.
- Each child of a mother affected with an X-linked dominant trait has a 50% chance of inheriting the mutation
- If only the father is affected, 100% of the daughters will be affected, since they inherit their father's X-chromosome, and 0% of the sons will be affected, since they inherit their father's Y-chromosome

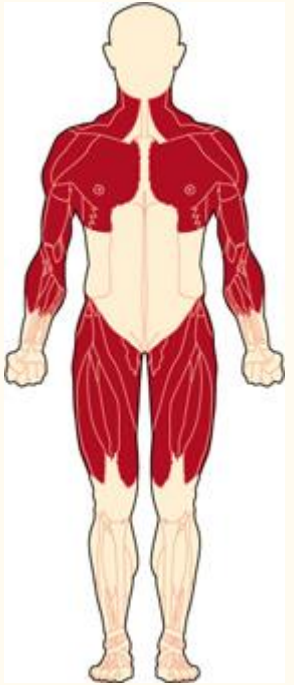


Examples of sex-linked traits...

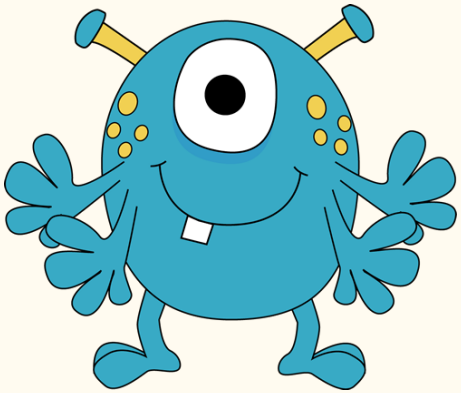
- Red-green colourblindness
- Male pattern baldness
- Haemophilia
- Duchenne muscular dystrophy

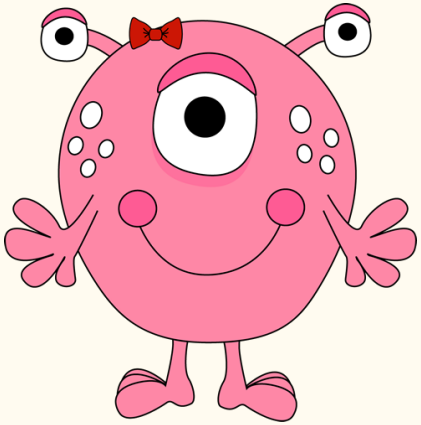






Monster Genetics Lab





- In this lab you will investigate how a combination of complete dominant, codominant, and incomplete dominant genes work together to create an organism.
- Work in partners, but hand in your own assignment!
- All you will need in a coin