

Advantages	Disadvantages
Variation in offspring means that some will be better suited to changing conditions, and so will survive better.	Need two parents that are able to reproduce
Mates can be selected to pass on desirable traits to the offspring.	If conditions are stable it could introduce variation, which may be counterproductive.
Humans can selectively breed traits in other species for their advantage. For example different rose types.	Involves energy in producing reproductive structures or phenotypes to attract mates
	If pollination is unsuccessful, then no seeds are produced – i.e. a waste of energy and time, as no genetic material will be passed on to future generations
	Time consuming compared to asexual reproduction (takes time to produce reproductive structures, attract pollinators etc.)

Sexual reproduction creates variation

Advantages	Disadvantages
Fast – do not have to spend time producing flowers or attracting mates	
No need to spend energy producing flowers or finding a mate	
No need to rely on pollinators/males	
Guaranteed success of producing offspring	
Can make numerous copies of plants through cuttings	Population overruns a food source quickly
All desirable traits are passed down	If parents have an undesirable trait then all offspring inherit it
All offspring are genetically identical and best suited to an environment if conditions remain stable	All offspring are identical so this creates vulnerability if the environment changes or pests/ diseases occur

Asexual reproduction produces identical offspring

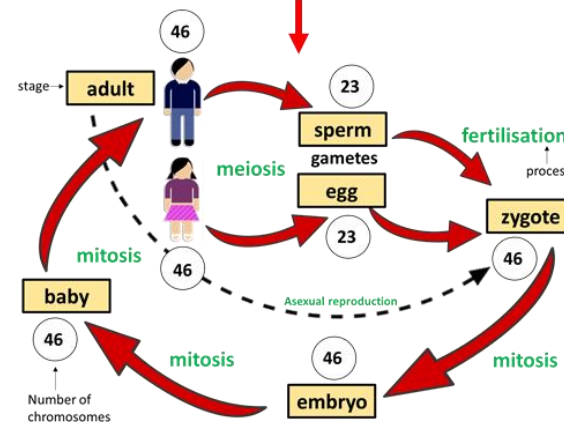


Reproduction can be sexual or asexual

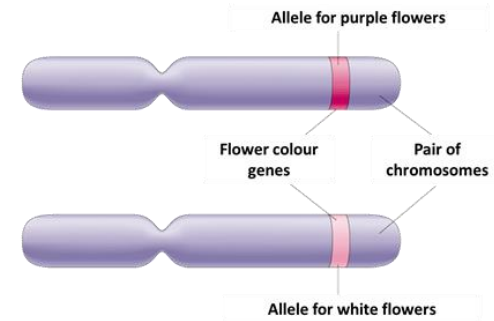
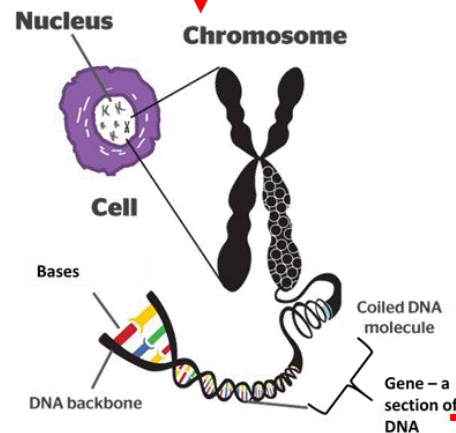
Dominant phenotype (trait)	Recessive phenotype (trait)
Cleft Chin	No Cleft
Widow's Peak	No Widow's Peak
Dimples	No Dimples
Brown/Black Hair	Blonde Hair
Freckles	No Freckles
Brown Eyes	Gray/Blue Eyes
Free Earlobe	Attached Earlobe

Continuous variation produces a trait anywhere along a range., such as height. Discontinuous Variation produces an "either/or" trait (physical characteristic).

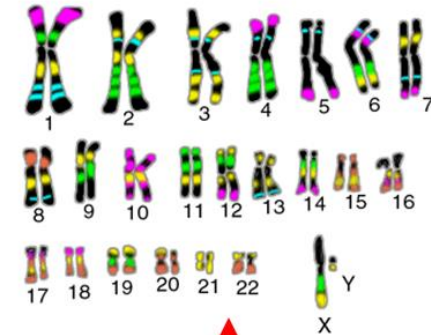
Variation occurs during Meiosis and fertilisation



Genetic material is carried in DNA

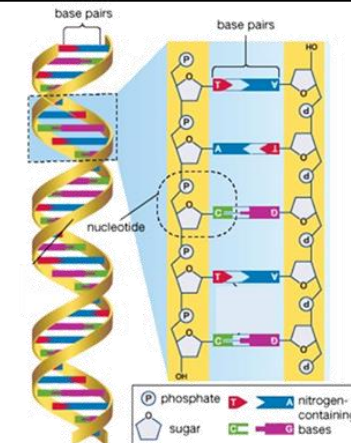


Genes code for physical traits, a variety of gene is called an Allele. We have 2 alleles for each Trait.



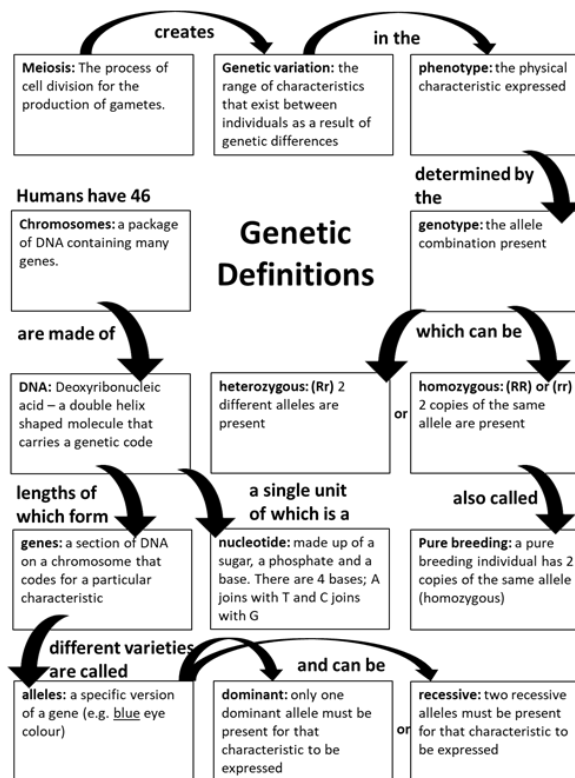
Humans have 23 pairs of Chromosomes in each cell

DNA has 4 bases
A T C G
They pair together
A-T
C-G

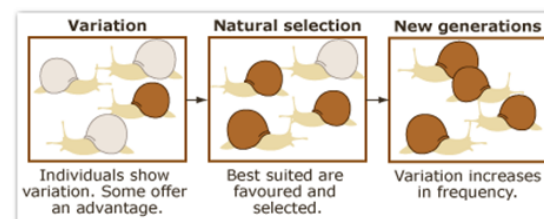


Genetic material is carried in DNA

Many ideas are linked to each other in genetics



Natural selection is the survival and reproduction of those individuals "best suited" to a given environment.



When there is a higher chance of survival for an individual with an better adapted trait then there is also more chance that the organism is alive long enough to find a mate and produce offspring than other less advantaged individuals. A higher frequency of offspring with the inherited advantageous **genes (genotype)** will be born.

Agouti Rabbit

	R	r
R	RR	Rr
r	Rr	rr

Genotype Ratios		
RR	Rr	rr
1	2	1
Phenotype Ratios		
Straight Ears		Lop ears
3		1

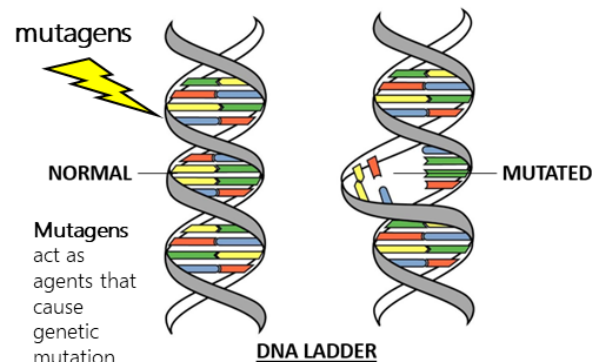
Phenotype and Genotype ratios can be calculated

Female = xx
Male = xy

A Punnett square can be used to demonstrate that in any fertilisation there will be a 50% chance of either a boy or a girl.

		Male gametes	
		X	Y
Female gametes	X	XX	XY
	Y	XY	YY

Punnett squares can also predict male and female offspring



Mutation causes a permanent change in the base sequence of DNA

Parents genotypes

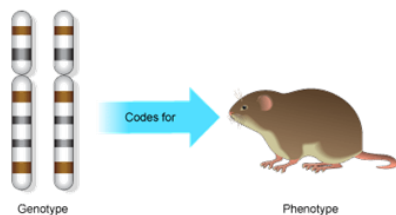
	B	b
B	BB	Bb
b	Bb	bb



Punnett squares predict genotype and phenotype of offspring

Genotype	Phenotype
EE Homozygous dominant	Detached Earlobes
Ee Heterozygous	Detached Earlobes
ee Homozygous recessive	Attached Earlobes

Three genotypes produce two phenotypes



The genotype (pair of alleles) codes for the phenotype (physical trait)

Ideas for last minute study sheet

1. **10 questions.** Working in pairs. Each student uses the sheet to write 10 questions that could be answered with information on the sheet. The other student could have a different topic sheet. Focus on the students creating specific questions – rather than “what is an acid”, ask “what colour would acid turn blue Litmus paper”. Swap over the question sheets for the other partner to answer (without the sheet). Once finished, use the sheet to check answers. For any answers that are incorrect, use the sheet to correct them.
2. **Concept maps.** Students use the information on the sheet to create a large concept map.
3. **Scaffolded Practice Tests.** Create a short test, either paper or online (i.e. Kahoot, FORMS, Education Perfect), where the students are able to use the sheet to help. Repeat the test (or an alternative) the next day, without the information sheet.
4. **Sticky Notes.** Write summary statements, using information on the sheet, on small post it notes (digital or paper) and find the area of their notes to place it on.