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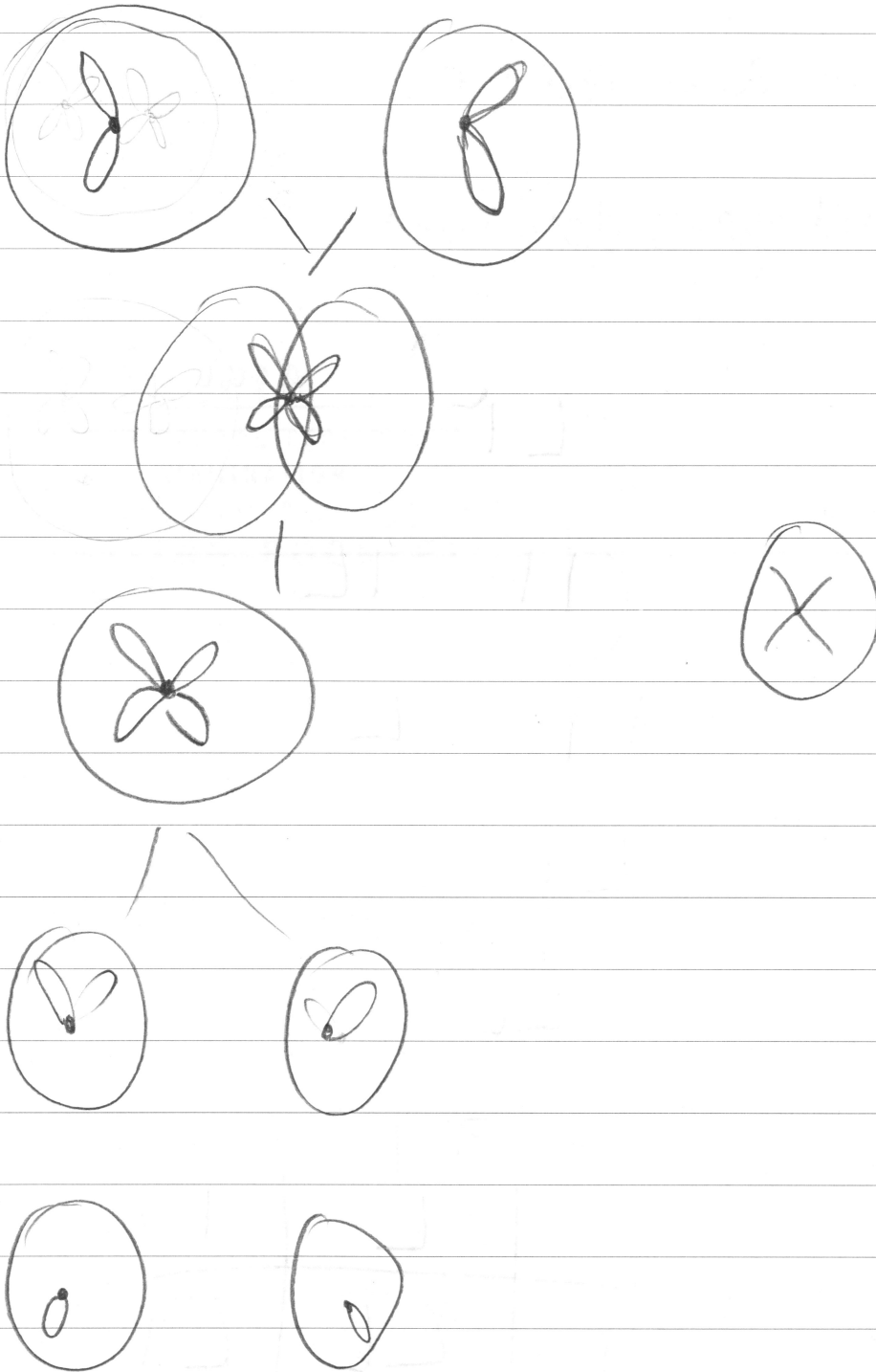
a) Trisomy - a mutation that generally leads to down syndrome.

Mutations affect on Chromosomes.

Organism	Mutation	Affect on Chromosomes
Human	Trisomy	Generally causes down syndrome. Gives one more chromosome which is too many.
Human.	Polyploidy	Effects the manufacturing of the chromosome. (chromosomes cannot work properly)
	Base Substitution	

b) Somatic cell, any cell other than sex cells (sperm & ova)

Somatic cell diploid number of 4.



Somatic cell diploid 4

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(c)

(i) Vision defect genes recessive.

Limb defect genes dominant.

(ii) Vv

Ll

VV Vv

ll Ll

VV Vv

ll Ll

Vv Vv

Ll

Vv

Ll

2:1

3:1

	V	v
v	Vv	vv
v	Vv	vv

	L	l
L	LL	Ll
l	Ll	ll

linked 3:1

linked 3:1

not linked 2:1

not linked. ~~4~~:1

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d i) Data can be collected because of new technologies, such as Recombinate DNA technologies.

Chromosome, e cells are taken from people and studied. This helps in identifying the relative position of linked genes.

The human genome project aimed to collect ~~gene~~ data, which then helped in analyzing the relative position of linked genes.

(ii) The human genome project did have alot of success but it could not be achieved in studying linkage maps because it aimed to determine the exact structure of DNA, looking at linkage maps did not do this, it aimed to find the DNA sequence yet again the linkage maps did not do this. It also wanted to find ~~the~~ about the DNA sequencing of other mammals, looking at or studying linkage maps did not do this.

e) When it was discovered that genes could be cloned many new technologies ~~and have~~ ~~been developed~~ applications in which how genes could be used were developed. Gene cascades has also led to the development of new applications for technologies such as producing whole artificial chromosome. The new artificial chromosome was inserted into a bacterium and resulted in surviving, reproducing bacteria, hardly success!

There has been and is a long going debate on ethical issue and such like whether it is ok to select certain genes (characteristics) that parents want their child to have. Through gene cloning a parent could have a child ~~looking like a superstar~~ ^{with desirable characteristics}. Many dispute this and feel that it goes against nature especially Christians who feel that it is playing God. But there are also some positives of gene cloning, that relate to cloning your child characteristics

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such as wing genes so that there is less of a chance that the ~~best~~ child will develop breast cancer.

Other applications that have come about due to gene cloning is being able to create ~~produce~~ a wider availability of produce of a certain item. Strawberries cannot be grown all year round in all areas because of frost, they are not frost resistant, but now thanks to good old Arctic salmon, strawberries can now withstand frost providing an abundant supply all year round. A gene is taken from the trout ~~&~~ and put into the strawberries. They are called transgenic species. The strawberries become frost resistant. This costs money and has social and environmental impacts, but it shows a new application for technology relating to gene cloning.

Gene cloning and gene cascade have led to the development of many new applications which help in developing our world.

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