

Definitions:

- A gene is A section of DNA that codes for a specific trait (a
- A gene locus is The location of a gene on the DNA
- Alleles are different forms of the same gene (can be dominant or
- Mutations are permanent changes in the sequence of bases
- A genome is all of the genetic information in the genes of an
- An amino acid sequence is the specific order of amino acids in a

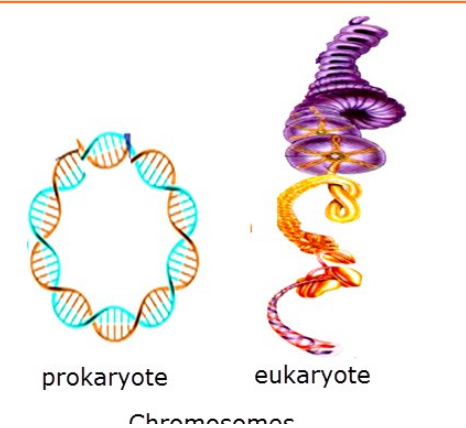
Base substitution mutations - cause sickle cell anaemia

What are the effects of a base substitution on each of the following

DNA	mRNA	amino acid sequence	haemoglobin
There is a permanent change in the sequence of bases in the DNA GAG --> GTG CTC     CAC	The mRNA codon transcribed is changed	GAG codes for GLU but GUG codes for VAL	The change in amino acid changes the

How can databases be used by biologists for the following:

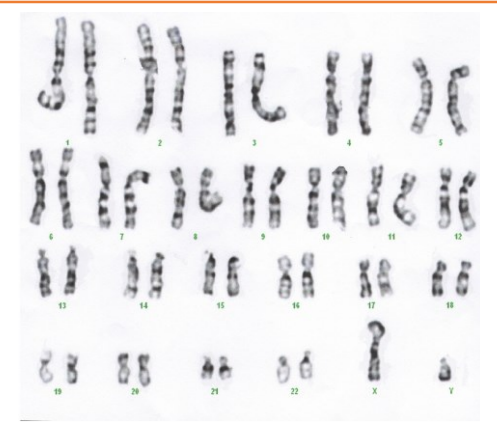
- To store the information from the human genome project  
As base sequences are discovered they are added to
- To find specific DNA base sequences  
A biologist can search for a specific sequence in all the
- To help find the function of specific genes  
Correlations can be found between genes and characteristics in the
- In the classification of living organisms  
similarities in the DNA between species can be compared using



Compare the arrangement of DNA in a prokaryote with that of a eukaryote.

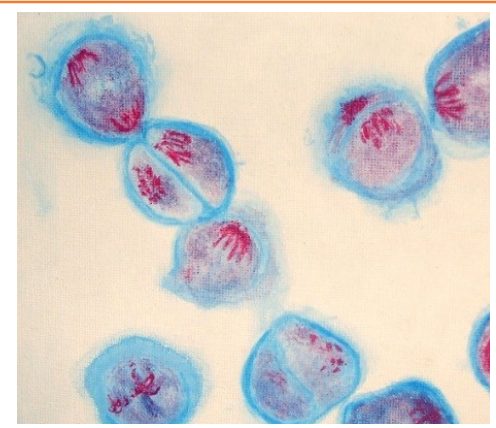
Prokaryotes have one single circular DNA molecule (and sometimes plasmids) no histone proteins are associated

Eukaryotes have many linear chromosomes DNA is associated with histone



What is the difference between a karyograms and a karyotype?  
A karyogram is the diagram, of photos on card, or digital representations. Karyotype refers to the actual

What are sister chromatids?  
Two chromatids on the same & homologous chromosomes? A pair of chromosomes each containing



Meiosis – write 3 words to summarize each phase of meiosis

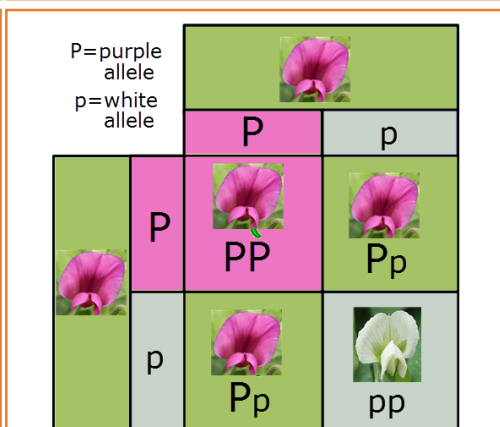
- P I Prophase - DNA coils up
- M I Metaphase chromosomes line up
- A I Anaphase - homologous chromosomes separate. Cell cytoplasm splits
- T I Telophase
- P II Prophase
- M II Metaphase
- A II Anaphase
- T II Telophase

Chromatids separate

Mendelian genetics and peas simple inheritance and punnet grids

Show the cross between two heterozygous plants. Name the

- parental genotypes Pp and Pp
- gametes P p
- offspring genotype 1PP:2Pp:1pp
- offspring phenotype 3 pink:1 white



Non-disjunction can cause the condition called Downs

To obtain cells for a karyotype analysis using karyograms doctors use these two methods:  
Chorionic villus & Amniocentesis

Risks to unborn baby and mother are:

**Sex-linked inheritance** is when the gene (and it's alleles) are found on the X chromosome (or 'sex

Symbols for alleles for Sex linked haemophilia are X<sup>H</sup> X<sup>h</sup> y- (only 3)

Symbols for alleles for red-green colour blindness are X<sup>R</sup> X<sup>r</sup>

**Dominant, recessive and co-dominant alleles in ABO blood groups**

The allele symbols for ABO blood groups are: #CLIPBOARD

**Multiple alleles** is when There are more than two alleles for

Blood group genotypes can be Group A = #CLIPBOARD & Group B = #CLIPBOARD

PCR is a technique that can make multiple copies of DNA very rapidly using heating and

Gel Electrophoresis can separate fragments of DNA of

DNA profiling is comparing the pattern of DNA fragments which separate in gel electrophoresis

Genetically modified organisms (GMOs)

Examples of GMO Bacteria that can be genetically engineered to make a useful product are:

- E. coli to make insulin
- E. coli to make human growth

**Natural clones** occur in many species, examples include;  
a-sexual reproduction / vegetative or identical twins.

Therapeutic cloning is Production of cells for use in

Reproductive cloning by somatic cell transfer is the production of a new organism using an adult cell nucleus

Mutagens & radiation can cause cancer

**Ethics**

Risks of GMO crops  
GMO pollen could pollinate wild species  
There could be unexpected effects

Benefits of GMO crops  
Increased crop yield  
reduced use of pesticides (e.g. in pest

