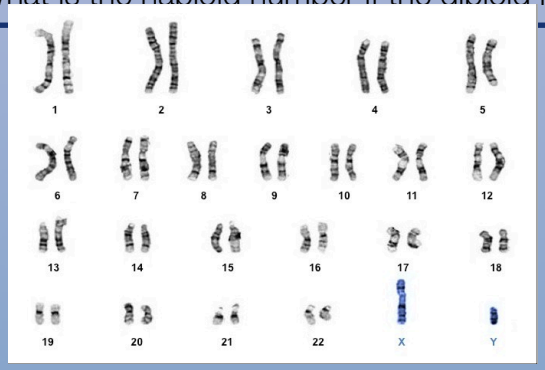
Genes, Chromosomes and Meiosis

Genes

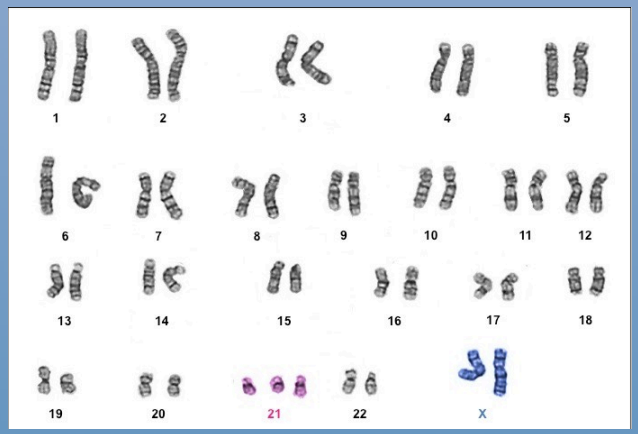
What is a gene?	A gene is a heritable factor that consists of the length of DNA and influences a specific characteristic.
What is a locus?	The locus occupies on specific position on the chromosome.
What are alleles and how do they differ?	Alleles are different forms of the same gene and occupy the same locus on a chromosome. They differ by one or a few bases.
What are SNP's (single nucleotide polymorphisms)?	SNP's (single nucleotide polymorphisms) are positions in a gene where there are more than one bases present.
What are mutations? What is an example of a mutation?	Mutations are random changed in the sequences of DNA. An example of a gene mutation is Sickle Cell Anemia.
What causes Sickle Cell Anemia and how does it affect humans? How does it relate to malaria?	Sickle Cell Anemia is caused by a mutation in the alpha globin polypeptide in hemoglobin. This changes the shape of red blood cells, causing them to be trapped in the capillaries, blocking them and reducing blood flow. Individuals that produce enough normal red blood cells and produce enough sickle cells increase resistance to malaria.
What is a genome?	A genome is the entire base sequence of each of the DNA molecules in an organism.
Where is a genome located in bacteria, plants, and animals?	In bacteria/prokaroytes, the genome is contained with circular chromosomes plus any plasmids present.In plants, the genome is contained in the nuclear chromosomes and DNA in mitochondria and chloroplasts. In animals, the genome is contained in nuclear chromosomes and DNA in the mitochondria.

Chromosomes

What are the structural and genetic characteristics of prokaryotic and eukaryotic chromosomes?	• Prokaryotes: single copy of each gene, have plasmids (extra DNA molecules that may be useful but are not necessary) • Eukaryotes: have both DNA and proteins, DNA is single, long and wrapped around histones
Why is the number of chromosomes a characteristic of species?	Chromosomes differ in both length and position of the centromere and there are at least 2 different chromosomes of every eukaryote.
What is the difference between haploid and diploid nuclei?	Haploid have only one chromosome of each type, diploid nuclei have 2 chromosomes of each type.
What is the haploid number if the diploid number is 20?	10, because it is half of the diploid.



Male, one x chromosome.



Female, two x chromosomes,
also trisonomy 21.

Meiosis

What is meiosis and why is it necessary?	Meiosis is a reproduction where the number of chromosomes are reduced by half , so that the cells are haploid. It is necessary for genetic variation.
What is variation and how does meiosis contribute to variation?	Variation is the differences between members of a population. Occurs during meiosis by the random separation of homologous chromosomes. Also occurs during prophase 1 and fusion of gametes from different parents.
What is nondisjunction? What are the consequences of nondisjunction in meiosis and mitosis?	Nondisjunction is the failure of the chromosomes to separate during cell division. In mitosis. The individual cell is affected, but organism is not harmed. In meiosis, the entire organism is affected.
Definition of karyogram:	Shows the chromosomes of an organism in homologous pairs in a decreasing length.
Karyogram to identify disease:	Down's Syndrome: trisonomy of 21 Trisonomy 18 and 13: 87-89 percent mortality of a year Klinefleter's Syndrome: trisonomy of sex chromosomes XXY Turner's Syndrome: monosomy of sex chromosomes XO