

Must Remember

- An organism has a full copy of its DNA inside the nucleus of every cell.
- Inside the nucleus the DNA is coiled up into long strands called chromosomes.
- On every chromosomes there are short sections of DNA called genes.
- Each gene codes for a particular characteristic.
- Humans have 46 chromosomes, 23 pairs.
- DNA is composed of two strands, the two strands are joined by chemicals called DNA bases, and the two strands twist to form a double-helix.
- The bases in DNA are A (adenine), T (thymine), C (cytosine), and G (guanine).
- The bases pair together, this is known as complimentary base pairing. A pairs with T and C pairs with G.
- Alleles code for characteristics, you inherit two allele for each gene, one allele from your mother and one allele from your father.
- Alleles can be dominant (these alleles code for characteristics that are always expressed) or recessive (these alleles code for characteristics that are only expressed if two are present).
- Punnett squares can be used to determine the probability of inheriting a certain characteristics.
- Some diseases can be inherited, some diseases are dominant and only require one diseased allele to be inherited, other diseases are recessive which require two recessive alleles to be inherited to be diseased.

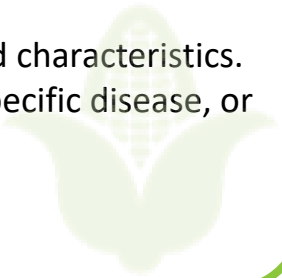


Maritime Futures – Genetically Engineered Fish

Genetic engineering involves the modification of genes to produce desired characteristics. To monitor pollution levels in the sea, scientists have been able to genetically engineer fish so that they change colour. The fish change colour in the presence of certain types of pollution. The changing of colour indicate if there is too much pollution in the sea and if cleaning efforts have been made to reduce the amount of pollution. Different colours would indicate different types of pollution.

Nice to know that...

- Humans can choose the traits of organisms through selective breeding, but this is a slow process and not very precise.
- Scientists can now alter an organism's genes to get desired characteristics.
- For example, crops can be produced to be resistant to a specific disease, or grow bigger to increase crop yield.
- This is known as genetic engineering.



Key Terms

- **Allele** - Different versions of the same gene
- **Characteristic** - A feature belonging to a person or another organism.
- **Chromosome** - Strand of DNA containing genes
- **Complimentary Base Pairing** - The bonds that form between A and T bases and the bonds that form between C and G bases.
- **DNA** - Biological polymer made from nucleotide monomers. The sequence contains all the information needed to make an organism
- **DNA Double Helix** - The structure formed by double stranded DNA.
- **Dominant Allele** - Version of a gene whose characteristics is always expressed if present in the genotype
- **Gene** - Section of DNA which codes for a characteristic
- **Genetic Cross** - Technique used to show the possible characteristics of an offspring
- **Genetic Engineering** - The deliberate modification of a characteristic by manipulating its genetic material.
- **Genotype** - The combination of alleles present in an organism
- **Phenotype** - Characteristics which are observed in an organism
- **Punnett Square** - Diagram used to show the possible genetic makeup of offspring, based on a mother's and a father's genes
- **Recessive Allele** - Version of a gene whose characteristic is only expressed if two copies are present in the genotype

Further Study

[BBC Bitesize – Genetic Inheritance](#)