

what is passed on, what is not, and the molecule that carries the instructions

The words, fixed first

- **heredity** is the passing of characters from parents to offspring across generations
- **variation** is the differences between individuals of the same species, including between brothers and sisters
- a **chromosome** is a thread of DNA in the nucleus, and humans have **23 pairs**
- a **gene** is a segment of DNA carrying the instruction for one character, and its alternative forms are **alleles**
- **inherited characters** are carried in the DNA: eye colour, blood group, height and the shape of features
- **acquired characters** are not inherited, since a change during a lifetime does not alter the DNA of the gametes

Nucleus _____

Chromosome _____

Gene _____

DNA _____



the nesting of the terms, smallest first: DNA makes up a gene, many genes lie along a chromosome, and the chromosomes sit inside the nucleus. Questions often turn on knowing which of these contains which

DNA, and what it does

- DNA is the molecule that carries the genetic instructions, shaped as a **double helix**, two strands wound about each other
- the two strands are held by **pairs of bases**, and the pairing is fixed: **A with T** and **G with C**
- because the pairing is fixed, **each strand carries the full information**, and the molecule can copy itself exactly
- that copying is what allows a character to be **passed on unchanged** through cell division
- a **mistake in copying** is a **mutation**, and it is the only source of genuinely new variation
- **genes** direct the making of **proteins**, and the proteins are what actually produce the character

	A	T	G	C
strand	A	T	G	C
partner	T	A	C	G

one strand of the molecule along the top and the partner it forces below it: because each base has exactly one permitted partner, either strand alone is enough to rebuild the whole pair, which is how the copying is exact

