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DNA: they are coded instructions for specific traits in every organism

* Made up of 4 bases (G,C, T, A) in a double helix
* Genes are on chromosomes
* Found in the nucleus
* Can be passes on sex cells (gametes ) only
* Watson and Crick founded the double helix

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Heredity: passing of dna instructions from one generation to another

Mutations: changes in the dna sequence

* Can be caused by chemicals, radiation, xrays, uv light, etc.
* Are random
* If mutations occur in the sex cells it can be passed to offspring (babies)
* Types of mutations : additions, deletions, substitutions

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 Traits = characteristics

 Some traits are observable (hair color, leaf shape)

 Some traits are unobservable (heart defect, diabetes)

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Allelle = another word for gene

**Asexual reproduction:** 1 parent/ exact DNA copy/ cloned/ mitosis

**Sexual reproduction**: 2 parents (gametes= egg and sperm that have half the gentic information of the parent. Example: humans have 46 chromosomes – but sperm has 23 and egg has 23.)/Meiosis

 Genetic recombination (think: recombines)

 The new cells are called daughter cells

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 DNA = A(adenine), T( thymine),

 C(cytocine), G (guanine)

These are bases and are connected by a weak chemical bond

Codon: sequence of 3 bases

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**Mutations** – changes in DNA base sequences

 -Mutations could result in a different amino acid sequence

 -If the amino acid sequence is changed, it could give

 different “instructions”.

* Sickle Cell is a mutation that causes red blood cells to be a different shape.
* Mutations can be deadly

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The internal (inside) and external (outside) environment can influence what genes are activated or expressed (shown).

 Example: Artic Fox or Artic rabbit

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Selective Breeding: A process of mating organisms (plant or animal) to get the best results needed

 Example: Fast horse for racing

 Strong horse for farming

 Larger or sweeter fruits or vegetables

Genetic Engineering: technology by humans that alter (change) DNA sequences of organisms. (also called biotechnology)

* This can result in new characteristics or organism varieties
* Restriction enzymes are like the “scissors” that cut at a specific DNA sequence.
* Ligase is used to “glue” the sticky ends of the plasmid and the DNA segment together.
* Plasmids are circular DNA sequences found in bacteria.
* Why do this?
	+ Helps to decode genes to find diseases
	+ Create crops that resist fungus or bugs
	+ Make medicine like insulin