Biology 6: Inheritance, Variation, Evolution

Section 1a: Sexual and Asexual Reproduction

1 Sexual Reproduction	Reproduction involving the **fusion of gametes**.
2 Gamete	A **sex cell** that contains **half the genetic information** of a body cell. E.g. **sperm** and **egg** in animals, **pollen** and **ovaries** in plants.
3 Meiosis	The type of **cell division** that **produces gametes**. Four daughter cells are produced from one original cell. Each cell is genetically different. Each daughter cell has half the genetic information of a body cell.
4 Fertilisation	**Fusion of gametes**. Restores the full number of chromosomes.
5 Asexual Reproduction	Reproduction involving **only one parent and no gametes**. No mixing of genetic information so genetically identical **clones** are produced. Only **mitosis** is involved.
6 Mitosis	**Cell division** that produces two identical daughter cells with the full amount of chromosomes.

Section 1b: Mitosis and Meiosis

	Mitosis	Meiosis
7 Number of daughter cells produced	2	4
8 Variation in cells produced	Genetically identical to each other and parent cell	Different to each other and parent cell
9 Purpose	Growth, repair, asexual reproduction	Produce gametes for sexual reproduction
10 Number of chromosomes	Full amount (pairs of chromosomes)	Half (single chromosomes)

Section 1c: Advantages and Disadvantages of Different Types of Reproduction

	Advantages	Disadvantages
11 Sexual Reproduction	Produces **variation**. Offspring are more likely to **survive changes** to the environment and disease.	**Requires a mate**. **Slower** way of producing offspring.
12 Asexual Reproduction	Produce **lots of offspring quickly**. **No mate** needed.	Offspring are **less likely to survive environmental changes** or diseases.

Section 2: Genetic Diseases

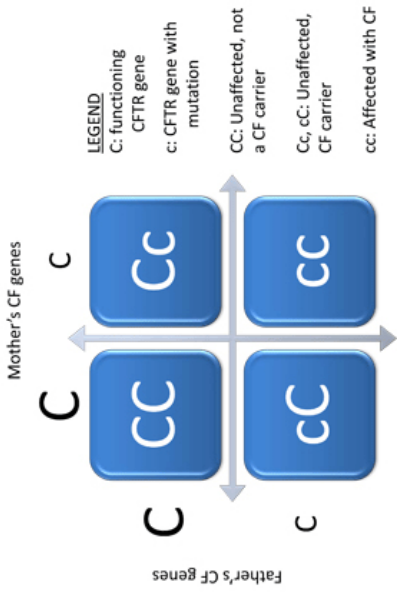
	Polydactyly	Cystic Fibrosis
13 Problem	Extra fingers and toes	Disorder of cell membranes. Causes sticky mucus on lungs.
14 Caused by…	**Dominant** allele	**Recessive** allele
15 Genotype of people with disease	PP or Pp	cc
16 Genotype of people without disease	pp	CC or Cc
17 Does the disease have carriers?	No	Yes – genotype Cc

Section 3: Genetics Key Terms

18 DNA	**Genetic material**. DNA is a **polymer** made up of **two strands** forming a **double helix**. The DNA makes up chromosomes.
19 Gene	A gene is a **small section of DNA** on a chromosome. Each gene **codes for a particular sequence of amino acids**, which **make a protein**.
20 Chromosome	A **long coil of DNA**. Found in the nucleus.
21 Genome	The **entire genetic material of that organism**.
22 Allele	**Different versions of the same gene** – dominant and recessive.
23 Dominant	A dominant allele is **always expressed**. Only **one copy** is needed.
24 Recessive	Only **expressed if two copies are present**.
25 Homozygous	**Both alleles** for a gene are the **same** (i.e. both are dominant or both are recessive).
26 Heterozygous	**Both alleles** for a gene are **different** (i.e. one is dominant, the other is recessive).
27 Genotype	The **alleles present** for a **particular gene**.
28 Phenotype	The **physical feature** expressed for a **particular gene**.
29 Single gene characteristics	Some characteristics are controlled by only one gene e.g. fur colour in mice, colour blindness in humans.
30 Multiple gene characteristics	Most characteristics are controlled by many genes e.g. height.

Section 4: Gender Inheritance

31 Human Chromosomes	Human body cells contain **23 pairs of chromosomes.** 22 pairs control characteristics only**, one pair controls sex.**
32 Males	Males have **two different chromosomes** – **XY**.
33 Females	Females have **two chromosomes** that are the **same** - **XX**.



34 Punnett square showing sex inheritance