

Reproduction

**What is sexual reproduction, and what are the gametes in animals and flowering plants?**

Reproduction

**What is asexual reproduction?**

Reproduction

**Which type of cell division makes identical cells, and which makes non-identical cells?**

Reproduction

**Describe what happens when a cell divides by meiosis.**

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**How do meiosis and fertilisation keep the chromosome number the same from one generation to the next?**

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**Describe the structure of DNA.**

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**What is a gene?**

Reproduction

**What is the genome?**

Reproduction with only one parent, no fusion of gametes and no mixing of genetic information. Offspring are genetically identical clones. Only mitosis is involved.

The joining (fusion) of male and female gametes: sperm and egg in animals, pollen and egg in flowering plants. Genetic information is mixed, giving variety in the offspring.

Copies of the genetic information are made, then the cell divides twice to form four gametes, each with a single set of chromosomes and all genetically different.

Mitosis makes identical cells. Meiosis makes non-identical cells.

A polymer made of two strands forming a double helix, contained in chromosomes in the nucleus.

Meiosis halves the number of chromosomes in gametes. Fertilisation restores the full number. The new cell divides by mitosis and, as the embryo develops, cells differentiate.

The entire genetic material of an organism.

A small section of DNA on a chromosome that codes for a particular sequence of amino acids, to make a specific protein.

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**Give three reasons why understanding the human genome is important.**

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**Define allele.**

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**What is the difference between a dominant and a recessive allele?**

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**What do homozygous and heterozygous mean?**

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**What is the difference between genotype and phenotype?**

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**Give two examples of characteristics controlled by a single gene. Are most characteristics like this?**

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**What ratio of phenotypes do you expect from a cross between two heterozygous parents?**

Reproduction **Higher tier**

**Construct a Punnett square for  $Bb \times bb$ . What is the probability of a  $bb$  offspring?**

A different form of the same gene.

Searching for genes linked to disease; understanding and treating inherited disorders; tracing human migration patterns from the past.

Homozygous: two alleles the same for a trait. Heterozygous: two different alleles.

A dominant allele is always expressed, even if only one copy is present. A recessive allele is only expressed if two copies are present.

Fur colour in mice and red-green colour blindness in humans. No, most are the result of multiple genes interacting.

Genotype is the alleles present. Phenotype is how the characteristic is expressed.

Gametes B, b and b, b. Offspring Bb, Bb, bb, bb. Probability of bb = 2 in 4 =  $\frac{1}{2}$  (50%).

3 dominant : 1 recessive, so a probability of 1 in 4 (25%) for the recessive phenotype.

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**In a family tree, two parents without a trait have a child with the trait. What does this show?**

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**Which disorder is caused by a dominant allele: polydactyly or cystic fibrosis?**

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**Give issues to consider about embryo screening.**

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**What are the human sex chromosomes?**

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**What is the chance that a baby is a girl or a boy, and why?**

Polydactyly (extra fingers or toes) is caused by a dominant allele. Cystic fibrosis, a disorder of cell membranes, is caused by a recessive allele.

The trait is recessive and both parents are heterozygous carriers.

Females XX, males XY. Humans have 23 pairs of chromosomes; 22 pairs control characteristics only.

It may alleviate suffering, but embryos are destroyed and there are economic, social and ethical concerns. Gene therapy research also raises ethical issues.

50% each (1 : 1). All eggs carry X; half the sperm carry X and half carry Y.