

B13 Reproduction

Lessons TBAT	Key Knowledge	Practical	Assessment
<p>TBAT: Compare and contrast sexual and asexual reproduction</p>	<p>Students should understand that meiosis leads to non-identical cells being formed while mitosis leads to identical cells being formed. Sexual reproduction involves the joining (fusion) of male and female gametes: • sperm and egg cells in animals • pollen and egg cells in flowering plants. In sexual reproduction there is mixing of genetic information which leads to variety in the offspring. The formation of gametes involves meiosis. Asexual reproduction involves only one parent and no fusion of gametes. There is no mixing of genetic information. This leads to genetically identical offspring (clones). Only mitosis is involved</p> <p>Students should be able to explain how meiosis halves the number of chromosomes in gametes and fertilisation restores the full number of chromosomes. Cells in reproductive organs divide by meiosis to form gametes. When a cell divides to form gametes: • copies of the genetic information are made • the cell divides twice to form four gametes, each with a single set of chromosomes • all gametes are genetically different from each other. Gametes join at fertilisation to restore the normal number of chromosomes. The new cell divides by mitosis. The number of cells increases. As the embryo develops cells differentiate. Knowledge of the stages of meiosis is not required.</p> <p>Students should be able to describe the structure of DNA and define genome. The genetic material in the nucleus of a cell is composed of a chemical called DNA. DNA is a polymer made up of two strands forming a double helix. The DNA is contained in structures called chromosomes. A gene is a small section of DNA on a chromosome. Each gene codes for a particular sequence of amino acids, to make a specific protein. The genome of an</p>	<p>NA</p>	<p>Extended writing question comparing screening methods</p>
<p>TBAT: Describe the process of meiosis</p>			<p>Maths focus</p> <p>Students should be able to understand the concept of probability in predicting the results of a single gene cross, but recall that most phenotype features are the result of multiple genes rather than single gene inheritance.</p>
<p>TBAT: Explain the importance of the genome</p>			<p>Students should be able to use direct proportion and simple ratios to express the outcome of a genetic cross.</p>
<p>TBAT: Predict the results of genetic crosses</p>			<p>(HT only) Students should be able to construct a genetic cross by Punnett square diagram and use it to make predictions</p>
<p>TBAT: Explain how sex is determined</p>			
<p>TBAT: Describe how certain diseases can be inherited</p>			
<p>TBAT: Describe three tests to</p>			

B13 Reproduction

<p>screen embryos for diseases</p>	<p>organism is the entire genetic material of that organism. The whole human genome has now been studied and this will have great importance for medicine in the future</p> <p>Students should be able to discuss the importance of understanding the human genome. This is limited to the: • search for genes linked to different types of disease • understanding and treatment of inherited disorders • use in tracing human migration patterns from the past.</p> <p>Students should be able to explain the terms: • gamete • chromosome • gene • allele • dominant • recessive • homozygous • heterozygous • genotype • phenotype. Some characteristics are</p>		<p>using the theory of probability.</p>
------------------------------------	--	--	---

## B13 Reproduction

	<p>controlled by a single gene, such as: fur colour in mice; and red-green colour blindness in humans. Each gene may have different forms called alleles. The alleles present, or genotype, operate at a molecular level to develop characteristics that can be expressed as a phenotype. A dominant allele is always expressed, even if only one copy is present. A recessive allele is only expressed if two copies are present (therefore no dominant allele present). If the two alleles present are the same the organism is homozygous for that trait, but if the alleles are different they are heterozygous. Most characteristics are a result of multiple genes interacting, rather than a single gene.</p> <p>Some disorders are inherited. These disorders are caused by the inheritance of certain alleles. • Polydactyly (having extra fingers or toes) is caused by a dominant allele. • Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele. Students should make informed judgements about the economic, social and ethical issues concerning embryo screening, given appropriate information.</p> <p>Ordinary human body cells contain 23 pairs of chromosomes. 22 pairs control characteristics only, but one of the pairs carries the genes that determine sex. • In females the sex chromosomes are the same (XX). • In males the chromosomes are different (XY).</p>	<p>Key stage 3</p> <p>Reproduction ♣ reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta ♣ reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.</p> <p>Inheritance, chromosomes, DNA and genes ♣ heredity as the process by which genetic information is transmitted from one generation to the next ♣ a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model ♣ differences between species ♣ the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation ♣ the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection ♣ changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction ♣ the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.</p>
--	--	---

