

**Genetic diversity and adaptation**

Specification reference	Checklist questions	
3.4.3	Can you explain that gene mutations involve a change in the base sequence of chromosomes?	<input type="checkbox"/>
3.4.3	Can you describe how gene mutations can arise spontaneously during DNA replication and include base deletion and base substitution?	<input type="checkbox"/>
3.4.3	Can you explain that not all base substitutions cause a change in the sequence of encoded amino acids, due to the degenerate nature of the genetic code?	<input type="checkbox"/>
3.4.3	Can you describe how mutagenic agents can increase the rate of gene mutation?	<input type="checkbox"/>
3.4.3	Can you explain that mutations in the number of chromosomes can arise spontaneously by chromosome non-disjunction during meiosis?	<input type="checkbox"/>
3.4.3	Can you describe how meiosis produces daughter cells that are genetically different from each other?	<input type="checkbox"/>
3.4.3	Can you describe the process of meiosis in terms of two nuclear divisions resulting usually in the formation of four haploid daughter cells from a single diploid parent cell?	<input type="checkbox"/>
3.4.3	Can you describe the process of meiosis in terms of genetically different daughter cells resulting from the independent segregation of homologous chromosomes?	<input type="checkbox"/>
3.4.3	Can you describe the process of meiosis in terms of crossing over between homologous chromosomes results in further genetic variation among daughter cells?	<input type="checkbox"/>
3.4.3	When given the chromosome content of the parent cell, can you complete diagrams showing the chromosome content of cells after the first and second meiotic division?	<input type="checkbox"/>

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3.4.3	Can you explain the different outcome of mitosis and meiosis?	<input type="checkbox"/>
3.4.3	When given information about an unfamiliar life cycle, can you recognise where meiosis occurs?	<input type="checkbox"/>
3.4.3	Can you explain how random fertilisation of haploid gametes further increases genetic variation within a species?	<input type="checkbox"/>
3.4.4	Can you describe genetic diversity as the number of different alleles of genes in a population?	<input type="checkbox"/>
3.4.4	Can you describe genetic diversity is a factor enabling natural selection to occur?	<input type="checkbox"/>
3.4.4	Can you list the principles of natural selection in the evolution of populations?	<input type="checkbox"/>
3.4.4	Can you explain how random mutation can result in new alleles of a gene?	<input type="checkbox"/>
3.4.4	Can you explain how many mutations are harmful but, in certain environments, the new allele of a gene might benefit its possessor, leading to increased reproductive success?	<input type="checkbox"/>
3.4.4	Can you describe how the advantageous allele is inherited by members of the next generation?	<input type="checkbox"/>
3.4.4	Can you explain how, over many generations, the new allele increases in frequency in the population?	<input type="checkbox"/>
3.4.4	Can you describe directional selection, exemplified by antibiotic resistance in bacteria?	<input type="checkbox"/>
3.4.4	Can you describe stabilising selection, exemplified by human birth weights?	<input type="checkbox"/>

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3.4.4	Can you explain how natural selection results in species that are better adapted to their environment?	<input type="checkbox"/>
3.4.4	Can you describe how adaptations may be anatomical, physiological or behavioural?	<input type="checkbox"/>
3.4.4	Can you use unfamiliar information to explain how selection produces changes within a population of a species?	<input type="checkbox"/>
3.4.4	Can you interpret data relating to the effect of selection in producing change within populations?	<input type="checkbox"/>
3.4.4	Can you show your understanding that adaptation and selection are major factors in evolution and contribute to the diversity of living organisms?	<input type="checkbox"/>
3.4.4	Can you use aseptic techniques to investigate the effect of antimicrobial substances on microbial growth?	<input type="checkbox"/>