

## Scheme of work for Chapter 4, *Genetics I*

Syllabus section	Content	Time required	Outline of lesson content	Coursebook resources	Worksheets	Teacher's resources / Teaching ideas
4.1	Chromosomes, genes, alleles and mutations	1–2 lessons	<ul style="list-style-type: none"> <li>Review the structure of DNA and chromosomes and define 'gene', 'allele' and 'genome'; outline gene mutations</li> <li>Use the example of sickle-cell anemia to explain the consequences of a base substitution to transcription and translation</li> </ul>	p67–70 Short-answer Qs p70 End-of-chapter Qs p96–99: Q1		Practical activity: video clips Link to TOK: ethics, or correlation/causal link between sickle-cell anemia and malaria Exemplar exam questions: Q2
4.2	Meiosis	2 lessons	<ul style="list-style-type: none"> <li>Outline the process of meiosis including definitions of reduction division and homologous chromosomes</li> <li>Explain non-disjunction and its consequences, using Down's syndrome as an example; explain the production and use of karyotyping in prenatal screening and identification of trisomy and gender</li> </ul>	p71–76 Short-answer Qs p74, p76 TOK p76 End-of-chapter Qs p96–99: Q3, Q4, Q11	Support: Q1 Extension: Q2	Practical activities: modelling practical; karyogram analysis
4.3	Theoretical genetics	5 lessons	<ul style="list-style-type: none"> <li>Define genetics terms; introduce the monohybrid cross using a Punnett grid</li> <li>Multiple alleles and ABO blood groups, sex determination</li> <li>Explain sex linkage, using hemophilia and colour blindness as examples</li> <li>Predict genotypic and phenotypic ratios in monohybrid crosses, sex-linked genes and multiple alleles</li> <li>Deduce genotypes and phenotypes in pedigree charts using the correct notations</li> </ul>	p77–87 Worked examples p78–86 Short-answer Qs p79, p87 TOK p86 End-of-chapter Qs p96–99: Q1, Q2, Q5, Q7, Q13	Support: Q2, Q3, Q4 Extension: Q1	Exemplar exam questions: Q1, Q3

4.4	Genetic engineering and biotechnology	5 lessons	<ul style="list-style-type: none"> <li>Describe DNA profiling in paternity and forensic tests, including PCR, gel electrophoresis and analysis of DNA profiles</li> <li>Outline the outcomes of the human genome project and discuss the project as an international endeavour</li> <li>Outline the procedure of gene transfer and why polypeptides produced by genes put into different species are unchanged</li> <li>Discuss the potential benefits and harm of genetic modification and use two examples of GM crops or animals</li> <li>Outline and discuss cloning of animals from differentiated cells; discuss the ethical issues of therapeutic cloning using an embryo to supply stem cells</li> </ul>	<p>p87–95</p> <p>TOK p88, p90, p94, p95</p> <p>Short-answer Qs p95</p> <p>End-of-chapter Qs p96–99: Q1, Q6, Q8, Q9, Q10, Q12, Q14</p>	<p>Support: Q5</p> <p>Extension: Q3, Q4, Q5</p>	<p>Practical activities: personal research project; balance sheet of GM consequences</p>
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