

Scheme of work for Chapter 11, *Human health and physiology II*

Syllabus section	Content	Time required	Outline of lessons	Coursebook resources	Worksheets	Teacher's resources / Teaching ideas
11.1	Defence against infectious disease	4 lessons	<ul style="list-style-type: none"> Describe the process of blood clotting Introduce the principle of challenge and response, clonal selection and memory cells in immunity; define 'active immunity' and 'passive immunity' Explain antibody production: antigen presentation by macrophages, activation of helper T-cells and B-cells and cloning of antibody-secreting cells Describe the production and use of monoclonal antibodies Explain the process of vaccination and discuss the benefits and dangers of the procedure 	p253–260 End-of-chapter Qs p284–287: Q1, Q5	Extension: Q2 Support: Q1, Q2	Practical activities: historical project on development of first vaccines; monoclonal antibodies in pregnancy testing Link to Aspects of internationalism: WHO vaccination programmes and statistics (link to Chapter 1)
11.2	Muscles and movement	4 lessons	<ul style="list-style-type: none"> Describe the structure of the human elbow joint and the roles of the bones, ligaments, tendons and nerves; compare the movement of the hip and knee joints Describe the detailed structure of striated muscle and how the actin and myosin filaments are arranged to produce dark and light bands Draw and label a sarcomere Explain the contraction of skeletal muscle including the release of Ca^{2+} ions, formation of cross bridges, sliding filaments and use of ATP to break cross bridges; analyse electron micrographs to assess the state of contraction of muscle fibres 	p260–266 Short-answer Qs p266 End-of-chapter Qs p284–287: Q2, Q8	Extension: Q3 Support: Q5	Practical activity: dissection of suitable animal joints

11.3	The kidney	4–5 lessons	<ul style="list-style-type: none"> Describe the structure of the kidney, annotating a diagram of a glomerulus and nephrons to show the function of each part in excretion and osmoregulation Explain the process of ultrafiltration, including the roles of blood pressure, fenestrated capillaries and the basement membrane; explain the process of reabsorption of glucose, salts and water in the proximal convoluted tubule Explain the roles of the loop of Henle, medulla, collecting duct and ADH in maintaining water balance in the blood Explain the concentrations of protein, glucose and urea in the blood plasma, glomerular filtrate and urine; explain why untreated diabetic patients have glucose in their urine 	<p>p267–274</p> <p>Short-answer Qs p273–274</p> <p>End-of-chapter Qs p284–287: Q3, Q6, Q7</p>	<p>Extension: Q4</p> <p>Support: Q4</p>	<p>Practical activities: dissection of lamb's kidney; plasmolysis of red blood cells (from scientific supplier); investigation of 'artificial urine' to identify kidney disease</p> <p>Link to Aspects of internationalism: diabetes in different parts of the world</p> <p>Exemplar exam question</p>
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11.4	Reproduction	5–6 lessons	<ul style="list-style-type: none"> Outline the process of spermatogenesis in the testis, including the location of interstitial cells, germinal epithelium and Sertoli cells; state the roles of LH, testosterone and FSH in the process Draw a mature sperm cell and outline the production of semen in the epididymis, seminal vesicle and prostate glands Outline the process of oogenesis and annotate a diagram of the ovary to show the location and functions of the germinal epithelium, follicles and secondary oocytes; draw a mature egg Compare oogenesis and spermatogenesis; describe the process of fertilisation Outline the early stages of embryo development including implantation of the blastocyst and the role of HCG; explain the structure and function of the placenta, including the secretion of estrogen and progesterone to maintain the pregnancy Outline how materials are exchanged between the maternal and fetal blood in the placenta and the protection given by the amniotic sac and fluid; outline the process of birth and its hormonal control, including changes in progesterone and oxytocin levels and positive feedback 	<p>p274–284</p> <p>Short-answer Qs p284</p> <p>End-of-chapter Qs p284–287: Q4, Q9</p>	<p>Extension: Q1, Q5</p> <p>Support: Q3</p>	<p>Practical activities: microscopic examination of ovary and testis; viewing photography of Lennart Nilsson</p>
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Note: 1 lesson = approximately 40 minutes