**Sample Course Outline**

Human Biology

General Year 12

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# Sample course outline

# Human Biology – General Year 12

## Unit 3 and Unit 4

## Semester 1 – Unit 3 – Coordination

| **Week** | **Key teaching points** |
| --- | --- |
| 1–2 | **Skeletal system**   * The skeleton * functions of the skeleton * axial skeleton * function * bones * appendicular skeleton * function * bones * Bones * microscopic structure   Practical activity – Observing bone tissue   * types of bones and their function * long bones * short bones * flat bones * irregular bones * long bones   Practical activity – The anatomy of a long bone   * structure * development for growth and repair |
| 3–4 | * Joints * function of joints * types of joints   Practical activity – Observing joints   * range of movement and location * immovable * cartilaginous * synovial joints (hinge, pivot, gliding, ball and socket) * structure of synovial joints * Treatment of damage to joints and bones caused by sporting injury (basic first aid, medication, surgery)   **Task 1: Science inquiry (practical) – Basic first aid for joint and bone injuries** |
| 5–6 | **Muscular system**   * Structure of skeletal muscles * macroscopic 🡪 microscopic (muscle fibre, fibrils, myofibrils, actin and myosin) * sliding filament theory (name of bands and zones not essential) * Movement at a joint   Practical activity – The relationship between muscles and bones   * antagonistic muscles * flexing arm at the elbow * Muscle tone * Walking * phases of walking * Balance * centre of gravity * Ongoing research into the causes and treatments of muscular system dysfunctions (e.g. muscular dystrophy, sarcopenia, myalgia)   **Commence Task 6: Extended response – Dysfunctions of the muscular, nervous and endocrine systems**  **Task 2: Test – Skeletal and muscular systems** |
| 7 | **Nervous system**   * Function of the nervous system * Division of the nervous system * central nervous system * structure and function – brain (cerebellum, cerebrum, brainstem) and spinal cord * protection – bone, meninges, cerebrospinal fluid   Practical activity – Brain dissection   * peripheral nervous system * structure and function * Structure and function of neurons (sensory, connector, motor) * Reflexes * reflex arc   Practical activity – Reaction times |
| 8–9 | * Sense organs – responding to changes in the external environment * receptors * location and function (light, sound, changes in position, chemical, touch, pressure, pain and temperature) * the eye   Practical activity – The pupil reflex   * structure and function   Practical activity – Eye dissection   * sight * the transmission of light to light receptors * accommodation (near and distant vision)   Practical activity – Accommodation   * stereoscopic vision   Practical activity – Seeing in 3D   * the role of rods and cones   Practical activity – The blind spot  **Task 3: Science inquiry (investigation) – The effect of age on accommodation distance** |
| 10–11 | * the ear * structure and function * hearing * the transmission of sounds to sound receptors * head position and movement – utricle and saccule, semicircular canals * the skin * function of skin receptors (pressure, pain and temperature)   Practical activity – Responding to stimuli   * Interaction of nervous and musculoskeletal system * balance * inputs to the cerebellum from * utricle and saccule * semicircular canals * eyes * stretch receptors in muscles and joints * pressure receptors in the skin * outputs from the cerebellum to muscles * walking * inputs to the cerebellum from cerebrum * outputs from the cerebellum to muscles * Ongoing research into the causes and treatments of nervous system dysfunctions (e.g. cataracts, glaucoma, deafness, Parkinson’s disease, Alzheimer’s disease, Multiple Sclerosis) |
| 12–14 | **Endocrine system**   * Role of hormones * Endocrine glands * location of endocrine glands (hypothalamus, pituitary, adrenal, pancreas, thyroid, pineal, parathyroid, testes, ovaries, placenta) * Homeostasis * negative feedback * components of feedback loop (stimulus, receptor, modulator, effector, response and feedback)   Practical activity – Negative feedback   * negative feedback loops relating to the hormonal regulation of metabolism * maintenance of body temperature (thyroxine) * role of thyroxine, cortisol, growth hormone and adrenaline in the regulation of metabolism * Ongoing research into the causes and treatments of endocrine system dysfunctions (e.g. diabetes, hypothyroidism, hyperthyroidism, menopause)   **Task 4: Externally set task**  **Task 5: Test – Nervous and endocrine systems** |
| 15 | **Task 6: Extended response – Dysfunctions of the muscular, nervous and endocrine systems** |

## Semester 2 – Unit 4 – Infectious disease

| **Week** | **Key teaching points** |
| --- | --- |
| 1–3 | **Disease**   * Infectious disease – definition * Pathogens * types of pathogens and examples of diseases * bacteria (e.g. salmonella) * viruses (e.g. influenza, Ross River disease) * fungi (e.g. tinea) * parasites (e.g. malaria) * transmission of pathogens   Practical activity – Modelling the spread of disease   * modes of transmission * direct and indirect contact (e.g. influenza, tinea, STIs, measles) * contaminated food and water (e.g. salmonella, gastroenteritis) * vectors (e.g. malaria, Ross River disease) * factors affecting transmission and spread * local, regional and global movement of individuals * hygiene practices in the workplace   **Task 7: Science inquiry (practical) – The effect of hand washing on the spread of infection** |
| 4–5 | * changing ideas about disease and disease transmission over time * preventing transmission of disease * quarantine * immunisation * disruption of pathogen lifecycle   **Task 8: Test – Disease** |
| 6–8 | **Vaccines and immunology**   * Inflammatory response (non-specific response) * histamine * phagocytes * lymphatic system * Specific responses * antigens * antibodies * memory cells   Practical activity – Modelling specific responses   * Immunity * natural exposure to pathogens * vaccination against pathogens   Practical activity – Modelling the effect of vaccinations  Commence Task 9: Extended response – Vaccinations |
| 9–10 | * Medical intervention to reduce the rate and severity of infection * antiseptics * antibiotics * risks associated with misuse of antibiotics * antibiotic resistance * superbugs * antivirals   **Task 9: Extended response – Vaccinations** |
| 11–13 | **Community and global health**   * Hygiene * reducing the risk of infection * Australia’s hygiene practices and standards * global variations in hygiene standards * travel warnings * ‘hygiene hypothesis’ * Influences on disease transmission * population density * movement patterns * contact with isolated communities * international collaboration in response to global issues (e.g. SARS, bird flu)   **Task 10: Test – Vaccines, immunology, community and global health** |
| 14–15 | * Sexually transmitted infections * common STIs (e.g. chlamydia, genital warts, gonorrhoea, syphilis, HIV) * transmission * prevention * treatment * impact of social behaviour on the transmission, spread and persistence of sexually transmitted infections   **Task 11: Science inquiry (investigation) – The effect of behaviour on the spread of STIs** |