Sample Course Outline

Human Biology

General Year 12

**Acknowledgement of Country**

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Sample course outline

Human Biology – General Year 12

Unit 3 and Unit 4

The scientific method content aligns with the science understanding and scientific literacy content of the unit and is integrated throughout the learning experiences.

**Scientific method**

* identify a topic for investigation; research and construct questions for investigation
* determine the appropriate methodology for investigations
* design scientific investigations, including the formulation of investigable questions and/or hypotheses, materials required, procedure to be followed to collect valid and reliable data, and identification of safety and ethical considerations
* conduct risk assessments to identify potential hazards and prevent potential incidents and injuries
* select appropriate equipment and techniques to safely, competently and methodically collect valid and reliable data, and use equipment with precision, accuracy and consistency
* represent qualitative and quantitative data in meaningful and useful ways, including the construction of appropriately labelled tables, process quantitative data using appropriate mathematical relationships and units, and draw appropriate graphs
* analyse data to identify and describe trends, patterns and relationships, including the use of appropriate mathematical techniques, and recognise errors and limitations in data
* draw conclusions consistent with the evidence and relevant to the question being investigated, identify further evidence that may be required, and recognise the limitations of conclusions
* evaluate the investigative procedure, including the relevance, accuracy, validity and reliability of data, and suggest improvements
* communicate information and ideas in a variety of ways using scientific conventions and terminology, including the selection and presentation of data and ideas to convey meaning to selected audiences in written, oral and multimedia formats

Semester 1 – Unit 3

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| Week | Key teaching points |
| 1–3 | **Cell reproduction**  **DNA**   * chromosomes are made up of large molecules of DNA found in the cell nucleus * DNA has a double helix structure that is made up of nucleotides with complementary base pairing * genes are units of inheritance and are responsible for carrying genetic information from one generation to the next   **Cell division**   * mitosis produces diploid cells for the purpose of growth and repair and meiosis produces haploid cells for the purpose of gamete production (names and specific details of stages not required)   **Assessment task 1 – Practical assessment** |
| 4–6 | **Reproductive systems**  **Male reproductive system**   * the production and delivery of gametes is facilitated by the structures of the male and female reproductive systems; females have additional structures that support the development of the unborn baby * the male reproductive hormones follicle stimulating hormone (FSH), luteinising hormone (LH) and testosterone have a role in the production and maturation of sperm   **Female reproductive system**   * the production and delivery of gametes is facilitated by the structures of the male and female reproductive systems; females have additional structures that support the development of the unborn baby * the female reproductive hormones follicle stimulating hormone (FSH) and luteinising hormone (LH) have a role in the production, maturation and release of ova; oestrogen and progesterone have a role in preparing the uterus for implantation after fertilisation (detailed menstrual and ovarian cycle not required)   **Production of gametes**   * mitosis produces diploid cells for the purpose of growth and repair and meiosis produces haploid cells for the purpose of gamete production (names and specific details of stages not required) * the production and delivery of gametes is facilitated by the structures of the male and female reproductive systems; females have additional structures that support the development of the unborn baby   **Sexually transmitted infections**   * sexually transmitted infections (STIs) can be prevented through safe sex methods and, if left untreated, can lead to serious health consequences * distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas * use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with the evidence and relevant to the question under investigation * identify examples of where the application of scientific knowledge may have beneficial, harmful and/or unintended consequences |
| 7–10 | **Pregnancy**  **Fertilisation**   * fertilisation combines the male and female gametes producing a zygote with genes from both parents and pregnancy will be established if implantation occurs   **Embryonic and foetal development**   * embryonic and foetal development have a known and predictable sequence of events (details of specific milestone events not required) * the placenta has an important role in the provision of nutrients to and removal of wastes from the developing baby * the unborn baby can be monitored utilising a variety of techniques, including ultrasound and blood tests * parental, embryonic and foetal testing can be done to detect a range of genetic and chromosomal abnormalities through the examination of karyotypes and DNA profiles * maternal lifestyle choices, including the use of drugs, alcohol and smoking, will affect the developing baby and ongoing health of the child * distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas * use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with the evidence and relevant to the question under investigation * identify examples of where the application of scientific knowledge may have beneficial, harmful and/or unintended consequences   **Birth**   * the sequence of events in the birth process prepare the baby and mother for delivery * various methods of delivery of the baby are available   **Assessment task 2 – Supervised written assessment** |
| 11–12 | **Reproductive technologies**  **Contraception**   * contraceptive methods or devices are used to prevent fertilisation or implantation * distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas * use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with the evidence and relevant to the question under investigation * identify examples of where the application of scientific knowledge may have beneficial, harmful and/or unintended consequences   **Infertility treatments**   * there are a variety of infertility treatments which help overcome infertility problems; each has its limitations, risks and benefits * distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas * use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with the evidence and relevant to the question under investigation * identify examples of where the application of scientific knowledge may have beneficial, harmful and/or unintended consequences |
| 13–15 | **Assessment task 3 – Project**  **Assessment task 4 – Externally set task** |

Semester 2 – Unit 4

| **Week** | **Key teaching points** |
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| 1–2 | **Infectious disease**  **Pathogens**   * infectious disease is caused by the invasion of a pathogen, including bacteria, viruses, fungi, protozoa and parasites   Transmission of pathogens   * transmission of a pathogen from one host to another occurs by various mechanisms, including direct and indirect contact * hygiene practices, including social distancing, personal protective equipment (PPE), hand hygiene and the use of antiseptics, assist in limiting the transmission of disease   **Commence Assessment task 5 – Investigation** |
| 3–6 | **Immune system**  **First line of defence**   * the first line of defence involves external non-specific biological, chemical and physical barriers to prevent the entry of pathogens   **Second line of defence**   * the second line of defence involves phagocytic cells, including neutrophils and macrophages, and other non-specific responses, including inflammation and fever   **Third line of defence**   * the third line of defence involves specific responses to antigens, including the production of antibodies and memory cells for short-term and long-term immunity (details of B and T cells are not required)   **Submit Assessment task 5 – Investigation** |
| 7–8 | **Immunity**   * passive and active immunity can be acquired through natural and artificial means   **Antimicrobial medications**   * antivirals and antibiotics can be used to reduce the rate or severity of infection * use and misuse of antibiotics can lead to the development of multidrug-resistant bacteria   **Assessment task 6 – Supervised written assessment** |
| 9–12 | **Community and global health**  **Immunisation**   * a vaccine prepares the immune system to recognise and fight a pathogen it has not previously been exposed to * national immunisation programs aim to develop herd immunity in communities * an individual’s decision to participate in immunisation programs can be influenced by the socio‑cultural context in which it is considered   **Assessment task 7 – Project** |
| 13–15 | **Infectious disease control**   * hygiene practices, including social distancing, personal protective equipment (PPE), hand hygiene and the use of antiseptics, assist in limiting the transmission of disease * contact tracing is a disease control strategy that involves identifying cases and their contacts to interrupt disease transmission * quarantine separates and restricts the movement of people who may have been exposed to an infectious disease and isolation separates and restricts the movement of people with an infectious disease * susceptibility of urban areas to epidemics and pandemics of infectious disease can be due to population density, variation in living conditions and healthcare provisions * the reporting of notifiable diseases enables public health authorities to restrict outbreaks, prevent possible epidemics and inform public health policy * the transmission and spread of infectious disease is facilitated by local, regional and global movement of individuals, and travel warnings provide information to help reduce risk of infection * international cooperation and communication are needed to evaluate the risk of the spread of disease, including the emergence of new viral diseases   **Assessment task 8 – Practical assessment** |