

# M6 Additional Biology 5

## Course Syllabus - 2024 Term 2

**Teacher:** Dr Peter Torr

**Department:** Science

**Subject Code:** ST33206

**Periods per week:** 3

**Credits:** 1.5

### Course Description

This course will begin by comparing asexual and sexual reproduction. The structure and function of all parts of the male and female reproductive systems will be reviewed. In addition to this we learn about the process of fertilization and different methods of birth control. The course will cover developmental biology, and will explain at the cellular level how the process is controlled by genes and intercellular signaling. The next unit will cover sexual reproduction in flowering plants. This unit will also cover the process of pollination, fertilization and germination.

### Course Content

1. Sexual reproduction in humans
  - 1.1. The male reproductive system
  - 1.2. The female reproductive system
  - 1.3. The menstrual cycle
  - 1.4. Sex hormones in humans
  - 1.5. Infertility in humans
  
2. Fertilization and embryonic development
  - 2.1. Fertilization
  - 2.2. Methods of birth control
  - 2.3. Sexually transmitted infections
  - 2.4. Early embryonic development

3. Sexual reproduction in plants
  - 3.1. Structure and function of a flowering plant
  - 3.2. Gamete formation
  - 3.3. Pollination
  - 3.4. Fertilization
  - 3.5. Germination

## Learning Outcomes

- Students will be able to define sexual reproduction as a process involving the fusion of the nuclei of two gametes to form a zygote.
- Students will be able to identify and name the parts of the male reproductive system.
- Students will be able to state the adaptive features of sperm.
- Students will be able to describe the roles of testosterone in the development and regulation of secondary sexual characteristics during puberty.
- Students will be able to identify and name the parts of the female reproductive system.
- Students will be able to state the adaptive features of egg cells.
- Students will be able to describe the roles of oestrogen in the development and regulation of secondary sexual characteristics during puberty.
- Students will be able to describe the menstrual cycle in terms of changes in the ovaries and in the lining of the uterus.
- Students will be able to describe the sites of production of estrogen and progesterone in the menstrual cycle and pregnancy.
- Students will be able to explain the role of hormones in controlling the menstrual cycle and pregnancy.
- Students will be able to outline the reasons for infertility in males and females.
- Students will be able to describe fertilization as the fusion of the nuclei from a male gamete (sperm) and a female gamete (egg cell/ovum).
- Students will be able to outline natural methods of birth control, limited to abstinence, monitoring body temperature and cervical mucus.
- Students will be able to outline chemical methods of birth control, which include the contraceptive pill, implant and intrauterine devices.

- Students will be able to outline methods of birth control that cause a barrier, limited to condom, femidom and diaphragm.
- Students will be able to outline surgical methods of birth control, limited to vasectomy and female sterilization
- Students will be able to outline artificial insemination, in vitro fertilization.
- Students will be able to discuss the social implications of contraception and fertility treatments.
- Students will be able to define sexually transmitted infections as an infection that is transmitted via body fluids through sexual contact.
- Students will be able to state that human immunodeficiency virus (HIV) is an example of an STI.
- Students will be able to explain how the spread of STIs is controlled
- Students will be able to describe the methods of transmission of HIV.
- Students will be able to state that in early development, the zygote forms an embryo which is a ball of cells that implants into the wall of the uterus.
- Students will be able to state the functions of the umbilical cord, placenta, amniotic sac and amniotic fluid.
- Students will be able to describe the function of the placenta and umbilical cord in relation to exchange of dissolved nutrients, gasses and excretory products and providing a barrier to toxins and pathogens.
- Students will discuss the advantages and disadvantages of breastfeeding compared with bottle-feeding using formula milk.
- Students will be able to outline the process involved in labor and birth, including the breaking of the amniotic sac, contraction of the muscles in the uterus wall, dilation of the cervix, passage through the vagina, tying and cutting the umbilical cord, delivery of the after birth.
- Students will be able to state the functions of the sepals, petals, anthers, stigmas and ovaries.
- Students will be able to distinguish between the pollen grains of insect-pollinated and wind-pollinated flowers.
- Students will be able to define pollination as the transfer of pollen grain from the anther to the stigma.
- Students will be able to define self-pollination as the transfer of pollen grains from the anther of a flower to the stigma of the same flower or different flower on the same plant.

- Students will be able to cross-pollination as the transfer of pollen grain from the anther of a flower to the stigma of a flower on a different plant of the same species.
- Students will be able to discuss the implications to a species of self-pollination and cross-pollination in terms of variation, capacity to respond to changes in the environment and reliance on pollinators.
- Students will be able to describe the growth of the pollen tube and its entry into the ovule followed by fertilization.
- Students will be able to state that fertilization occurs when a pollen nucleus fuses with a nucleus in an ovule.
- Students will be able to describe the structural adaptations of insect-pollinated and wind-pollinated flowers.
- Students will be able to investigate and state the environmental conditions that affect the germination of seeds, limited to the requirement of water, oxygen and a suitable temperature.

## Learning Resources

- Textbook: Holt McDougal Biology
- PowerPoints/Google Slides presentations
- Boardworks
- Khan Academy
- CK12
- Gizmos
- EdPuzzle

## Assessment Methods

Unit quizzes will be used to assess students' understanding of the concepts within each unit. Unit quizzes will be worth 30% of the total assessment.

Students' lab work will be judged on planning, attention to detail, ability to draw conclusions and depth of evaluation. Lab work, along with any other projects, presentations, classwork and homework will be included in the student work category. This accounts for 40% for the total grade.

Final exams will be worth 30% of the total score. The exam will include a range of problems taken from all units studied during the semester. About 40% of the exam will consist of problems that will cover the fundamental skills. About 40% of the exam will consist of problems that will require a deeper understanding of each topic and

will require students to combine skills from several topics. About 20% of each exam will consist of real-world application problems.

## Homework Policy

Any late assignments will receive a maximum score of 50% of the total possible points.

Two weeks after the due date, assignments will not be accepted and a grade of 0 will be given.

If students are absent when assignments are assigned or on an assignment due date it is the responsibility of the student to contact the teacher to make arrangements for submission.

## Evaluation Breakdown

Assessments	30%
<ul style="list-style-type: none"><li>• Unit Tests</li><li>• Quizzes</li></ul>	
Student Work	40%
<ul style="list-style-type: none"><li>• Lab work</li><li>• Classwork/Homework</li><li>• Projects</li></ul>	
Final Exam	30%