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**Year 11 ATAR HUMAN BIOLOGY**

**2017 PROGRAM**

**UNITS 1 & 2**

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**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**RSHS 2017 ASSESSMENT OUTLINE**

**UNIT 1 \*** *Please note this outline is subject to change \**

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| **Assessment Type** | **Topic** | **Schedule** | **Weighting** | **My Mark** |
| **SCIENTIFIC INQUIRY (20%)** | **Microscope & Tissues Investigation** | *Term 1, Week 3* | 10 |  |
| **Second Hand Data Investigation** | *Term1, Week 10* | 10 |  |
| **EXTENDED RESPONSE (15%)** | **Digestion & Lifestyle** **Extended Response** | *Term 1, Week 8* | 7.5 |  |
| **Musculoskeletal System****Extended Response** | *Term 2, Week 4* | 7.5 |  |
| **TEST & EXAMINATIONS (25%)** | **Period Zero: Cell Test** **(Topic 1)** | *Term 1, Week 6* | 12.5 |  |
| **Period Zero: Systems Test** **(Topic 2 & 3)** | *Term 2, Week 2* | 12.5 |  |
| **EXAM (40%)** | **Semester 1 Exam** | *Term 2,* *Weeks 6 & 7* | 40 |  |

**UNIT 2**

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| **Assessment Type** | **Topic** | **Schedule** | **Weighting** | **My Mark** |
| **SCIENTIFIC INQUIRY (20%)** | **Cancer Investigation** | *Term 3, Week 3* | 10 |  |
| **Hormones Investigation** | *Term 3, Week 8* | 10 |  |
| **EXTENDED RESPONSE (15%)** | **Protein Synthesis** **Extended Response** | *Term 2, Week 10* | 7.5 |  |
| **Sexually Transmitted Infections & Contraception Extended Response** | *Term 3, Week 10* | 7.5 |  |
| **TEST (25%)** | **Period Zero: DNA & Inheritance Test (Topic 5 & 6)** | *Term 3, Week 5* | 12.5 |  |
| **Period Zero: Human Reproduction Test (Topic 7)** | *Term 4, Week 1* | 12.5 |  |
| **EXAMINATIONS (40%)** | **Semester 2 Exam** | *Term 4,* *Week 3 & 4* | 40 |  |

**ROSSMOYNE SENIOR HIGH SCHOOL - PROGRAM FOR UNIT 1 AND 2, 2017**

**\*** *Please note this program is subject to change \* Note: SIS = Scientific Inquiry Skills, SHE = Science as a Human Endeavour*

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| **WEEK** | **TOPIC** | **OBJECTIVES & OUTLINE** | **RESOURCES/SUGGESTED ACTIVITIES/QUESTIONS** | **ASSESSMENTS & IMPORTANT DATES** |
| **Term 1,****Week 1** | Introduction**Start Topic #1**1a.Scientific InquiryMicroscopes | Programs & Syllabus[*http://senior-secondary.scsa.wa.edu.au/syllabus-and-support-materials/science/human-biology*](http://senior-secondary.scsa.wa.edu.au/syllabus-and-support-materials/science/human-biology)*RSHS Upper School Assessment Policy*[*http://www.rossmoyne.wa.edu.au/about-us/policies/assessment-and-reporting-policy/*](http://www.rossmoyne.wa.edu.au/about-us/policies/assessment-and-reporting-policy/)**Investigating Scientifically**:* Review terminology
* identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes (SIS)
* represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error, and uncertainty and limitations in data; and select, synthesise and use evidence to make and justify conclusions (SIS)

**Microscopes**: * Calculate magnification, field of view, estimate cell size
 | Materials: Textbook, Study Guide, Past Exam Papers***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 1 & 2, Pages 3-26***Scientific Method TerminologyHomework: Scientific Method QuestionsMicroscope Practice & LabsCalculation WorksheetsHomework for weekend – Review cell organelles (Yr 10) |  |
| **Week 2** | 1b.Cells & Cell TransportTissues | **Cells**:* Review organelles from Year 10
* Hierarchy (cells, tissues, organs, systems), structures and functions
* Label cell organelles and outline function/s

 **Cell Membrane & Transport of materials**:* Structure of Cell membrane
* Fluid Mosaic Model
* Transport: Diffusion, Osmosis, Facilitated Diffusion, Active Transport, Vesicular transport
* Factors affecting exchange of materials across the membrane:
* Surface area to volume ratio
* Concentration gradients
* Nature of materials being exchanged

**Tissues**:* The various tissues of the human body perform specific functions and can be categorised into four basic tissue types:
	+ Epithelial
	+ Connective
	+ Muscular
	+ Nervous
* SIS – Use images of various tissues to communicate conceptual understanding and make predictions
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 3-5, Pages 27-61***Cell worksheets, Cell Transport flow chartSTAWA STAGE 2: BODY WORKSActivity: SA:Vol – why is it important?Activity 4: The exchange of materials (Part A: Diffusion DEMO)Egg & Osmosis video/ activity<https://www.youtube.com/watch?v=SrON0nEEWmo>Create a comparison table of Tissue types (Types, where found in the body, description, special features)Worksheet – Predicting tissues |  |
| **Week 3** | 1cCellular Metabolism | **Cellular Metabolism**:* Cellular respiration to release energy in form of ATP
* Catabolism vs. Anabolism
* ATP & its uses
* Aerobic vs. Anaerobic – reactants, products, location, amount of ATP
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 6, Pages 67-73***Comparison table – Aerobic vs. AnaerobicSTAWA STAGE 2: BODY WORKSActivity 7: Respiration – Aerobic and Anaerobic  | **Investigation: Microscopes & Tissues** **10%** |
| **Week 4** | 1d.Nutrients Enzymes | **Nutrients**:* Cells require nutrients including: Carbohydrates, proteins, lipids etc.

**Enzymes**:* Structure
* How they work – lock and key, activation energy
* Factors affecting – pH, temperature, concentration, co-factors and co-enzymes
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 6, Pages 63-67, 71***STAWA STAGE 2: BODY WORKSAct 20: Contents of my food Act 19, 21 or 22 (Food and nutrients)Act 27: Effective Enzymes |  |
| **Weeks****5 + 6** | **Start Topic #2**2a. Digestion | **Digestive System:*** Digestion involves the breakdown of large molecules to smaller ones by mechanical digestions and chemical digestion (by enzymes)
* Structure and Function
* The sequence of organs is important in the efficient digestion of food and absorption of nutrients in providing the appropriate conditions and enzymes.
* Absorption & Efficiency of surfaces – large surface area of Small intestines aids in absorption, structure of villi
* Elimination is the removal of undigested material and some metabolic wastes from the body
* (SHE) Dysfunctions e.g. diarrhoea, constipation
* (SHE) Consequences of lifestyle – malnutrition, obesity, anorexia
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 9, Pages 107-121***Tripe DissectionSTAWA STAGE 2: BODY WORKSAct 23: Inside the Digestive SystemAct 24: Digestion Simulation Act 26: Why is there acid in my stomach?Act 28: Digestion of fats | **WEEK 6****PERIOD ZERO:** **Cell Test** **(Topic 1)****12.5%** |
| **Week 7** | 2b. Excretion | **Excretion**:* Structure and function of organs involved
* Macrostructure of the kidney & urinary system
* Introduce structure of the nephron – filtration, reabsorption and secretion (no hormones req. For year 11)
* SHE: effect of performance enhancing drugs
* Urine composition with respect to volume & concentration. Hydrated vs. Dehydrated. Urine colour charts?
* The role of the liver and process of deamination
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 10, Pages 122-134***Kidney DissectionSTAWA STAGE 2: BODY WORKSAct 32: Urine Production |  |
| **Week 8** | **Start Topic #3**3a. Respiratory System | **Respiratory System**:* Structures and functions
* Gas exchange – Alveoli suited for function, internal vs. external respiration, how exchange is maintained
* SHE: dysfunctions of Resp system – diagnosis & treatment (Asthma, Emphysema)
* SHE: Consequences of life choices on the individual & foetus e.g. Smoking
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 8, Pages 97-106***Lung DissectionSTAWA STAGE 2: BODY WORKSActivity 12: Respiratory Volumes | **Extended Response: Digestion & Lifestyle** **7.5%** |
| **Weeks****9 + 10** | 3b. Cardiovascular System | **Circulatory System**:* The transport of materials within the internal environment for exchange with cells is facilitated by the structure and function of the circulatory system at the cell, tissue and organ levels.
* Heart structures and functions
* Outline the types and describe the structure and function of the different blood vessels and blood components
* Describe the pathway of systematic and pulmonary circulation
* Understand the role of the lymphatic system – return excess fluid to the CV system
* SHE: Blood transfusions rely on determining blood groups and can be used to treat many different diseases and conditions
	+ Blood groups ABO & Rh+/- blood systems – blood matching of donor and recipient. Maternal & foetal incompatibility due to Rhesus
* SHE: consequences of lifestyle choices, including being active or sedentary
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 7, Pages 75-96***Heart DissectionSTAWA STAGE 2: BODY WORKSActivity 17: Cardiovascular Disease (Data Interpretation) | **WEEK 10****Investigation: Second Hand Data 10%** |
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| **WEEK** | **TOPIC** | **OBJECTIVES & OUTLINE** | **RESOURCES/SUGGESTED ACTIVITIES/QUESTIONS** | **ASSESSMENTS & IMPORTANT DATES** |
| **Term 2, Week 1** | 3b.  | Finish Cardiovascular System***Revision for Systems Test (Week 2)*** |  |  |
| **Weeks****2 + 3** | **Start Topic #4**4a. Musculoskeletal System | **Musculoskeletal System**:* Describe and label the macroscopic structure of the bone. (Compact vs. Cancellous)
* Names and label the bones of the human body (Axial and Appendicular)
* Describe and label the Haversian System
* Describe the different types of joints in the body – types, locations, features, range of movements
* SHE: strains and breaks
* Outline and describe the different types of cartilage
* Osteoarthritis & Osteoporosis – causes, impacts, symptoms, treatments
* Describe and compare the different types – skeletal, cardiac & smooth
* Label a Macroscopic skeletal muscle
* Explain muscles working in pairs - Agonist vs. Antagonistic movement
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 11-12******Pages 135-163***Long bone dissectionSTAWA Stage 3: Changing BodiesAct 26: Bones & Osteoporosis Act 27: Joints and ArthritisAct 28: Muscle Movement | **WEEK 2****PERIOD ZERO:****Systems Test (Topic 2 & 3)** **10%**  |
| **Week 4** | Musculoskeletal System | * Label a microscopic view/sarcomere – actin, myosin and the zones/lines/bands
* Explain in detail the sliding filament theory – contraction vs. relaxation.

*Rest of week: Catch-up* | Videos ‘Sliding Filament Model’ | **Extended Response: Osteoporosis & Osteoarthritis****7.5%** |
| **Week 5** | **Assessment Free Week*.*** *Note: content may still be taught during this time* |
| **Weeks****6 + 7** | **SEMESTER ONE EXAMINATIONS** | **SEMESTER 1 EXAM** **40%** |
| **Weeks****8 + 9** | **Start Topic #5**5a. DNA | Review Exams (~2 days)**DNA**:* Structure – histones, double stranded, nucleotide composition, base pairing
* Purpose – stores the information for the production of Proteins that determines the structure and function of the cells
* Describe DNA replication

**Protein Synthesis:*** Outline the process of Protein Synthesis: Transcription and Translation
	+ Protein Synthesis involves the transcription of a gene on DNA into mRNA in the nucleus, and translation into an amino acid sequence at the ribosome with the aid of tRNA.
* SIS: Use construct models of transcription & translation to communicate
 | Exam Review & Reflections***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 13******Pages 165-179***STAWA STAGE 2: BODY WORKSAct 34: DNA – Life’s Master Molecule STAWA Stage 3: Changing BodiesAct 13: Protein Synthesis and mutationsVideos – Protein Synthesis |  |
| **Week 10** | 5b. Epigenetics | **Epigenetics:*** Epigenetics is the study of phenotypic expression of gene, which depends on the factors controlling transcription and translation during protein synthesis, the products of other genes and the environment
	+ Describe histone modification and DNA methylation
* SHE: discoveries made through modern biotechnological techniques have increases understandings of DNA & gene expression
 | STAWA STAGE 2: BODY WORKSAct 41: Nature vs. NurtureSTAWA Stage 3: Changing BodiesAct 14: Epigenetics and Gene expression | **Extended Response: Protein Synthesis** **7.5%** |
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| **WEEK** | **TOPIC** | **OBJECTIVES & OUTLINE** | **RESOURCES/SUGGESTED ACTIVITIES/QUESTIONS** | **ASSESSMENTS & IMPORTANT DATES** |
| **Term 3,****Week 1** | 5c. Mitosis, Meiosis & Cancer | **Cell Reproduction*** Describe the stages of mitosis and the events that take place in each phase
* Describe the stages of Meiosis - stages of Meiosis allow for orderly distribution of haploid sets of chromosomes to daughter cells
* Compare Mitosis vs. Meiosis
* Briefly describe the common symptoms of cancer and treatments available.
* Outline the preventative tests available for Cancer screening – mammogram, pap smear, prostate check
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 14 & 15******Pages 181-190, 197-200***STAWA STAGE 2: BODY WORKSAct 33: Meiosis – Dividing to multiply |  |
| **Week 2** | **Start Topic #6**6a. Inheritance, Punnett Squares | **Inheritance:*** Inheritance terminology & definitions
* Describe the different types of inheritance
* DNA profiling identifies the unique genetic make-up if individuals and can be used in determining parentage
* Probable frequencies of genotype and phenotype of offspring can be predicted using Punnett squares and by taking into consideration patterns of inheritance, including the effects of dominance/recessive, co-dominance, autosomal or sex-linked alleles and multiple alleles
	+ Examples: Huntington’s Disease, phenylketonuria (PKU), ABO blood groups, red-green colour blindness, haemophilia
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 22 & 23******Pages 302-347***Terminology SheetPunnet Square practice and predictionsSTAWA STAGE 2: BODY WORKSAct 36: What will my kids look like?Act 38: Monohybrid crosses |  |

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| **Week 3** | 6a |  Continue inheritance* Pedigree charts can constructed for families with a particular genetic disorder and can be used to reveal patterns of inheritance and assist in determining the probability of inheriting the condition in future generations
* SHE: Select, construct & use appropriate representations, including models of karyotypes to communicate conceptual understanding, solve problems and make predictions
 | Pedigree worksheetsSTAWA STAGE 2: BODY WORKSAct 39: Family Trees | **Investigation: Cancer** **10%** |
| **Week 4** | **Start Topic #7**7a. Reproduction & Gametogenesis | **Reproduction*** Outline the purpose of reproduction
* Male and female reproductive structures and functions
	+ The production of offspring is facilitated by the structure and function of the male and female reproductive systems in producing and delivering gametes for fertilisation and providing for the developing embryo & foetus
* Gametogenesis:
	+ Human Reproduction: Human gametes are produced through spermatogenesis and oogenesis, which are specific forms of meiosis, but varying significantly in process and products
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 15,*** ***Pages 191-196, 200-208***STAWA STAGE 2: BODY WORKSAct 42: Reproductive Systems |  |
| **Weeks****5 + 6** | 7b. Reproductive Cycles, Hormones & Fertilisation  | * Both male and female reproduction is regulated by hormones including the regulation of the ovarian & menstrual Cycles:
* Hormonal regulation of female menstrual and ovarian cycles: FSH, LH, Oestrogen & Progesterone
* Role of hormones in male reproductive system – FSH, LH, Testosterone

**Coitus & Fertilisation:*** Outline sexual intercourse and events that take place
* For the establishment of a pregnancy, conception requires the union of viable sperm and ovum at the optimum time in the ovarian cycle
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 16******Pages 209-220***STAWA STAGE 2: BODY WORKSAct 44: Menstrual Cycles | **PERIOD ZERO:****DNA & Inheritance** **Test****(Topic 5 & 6)** **12.5%** |
| **Week 7** | 7d. Development, Teratogens & Stem Cells | **Embryonic and Foetal development*** Briefly describe the stages/main events that take place over the embryonic and foetal period (during the 9 months)
	+ Describe cell differentiation and the development of the three primary germ layers
* Outline the impact of Teratogens on the embryo/foetus
* SHE: lifestyle choices including diet, illicit drugs, alcohol and nicotine may affect foetal development

**Stem Cells:*** Define a stem cell
* Outline the 3 types and sources of stem cells (Totipotent, Multipotent and Pluripotent)
* Briefly describe the medical uses of stem cells
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 17 - 18******Pages 222-249***STAWA STAGE 2: BODY WORKSAct 52: Foetal Growth & DevelopmentAct 53: Teratogens – Will this harm my baby? |  |
| **Week 8** | 7e. Birth, Changes after birth & Breastfeeding | **Birth and Change*** Describe the events that take place during the three stages of Labour
* Compare circulatory changes that take place between foetus &. neonate
* Describe and be able to label breast structures and functions
* Describe the milk let down reflex and the hormones involved
* Compare Breast feeding vs. Bottle feeding (advantages and disadvantages on both mother and baby)
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 19******Pages 260-272*** | **Investigation: Hormones** **10%** |
| **Week 9** | 7c. Contraception & STIs | **Contraception and STIs:*** Contraception methods that reduce the probability of the union of gametes or implantation (all have limitation, risks and benefits).
	+ Outline the different methods: Hormonal, Mechanical barriers, Chemical and Sterilisation (use, effectiveness, advantages and disadvantages)
* Sexually Transmitted infections (STI’s), diseases transmitted through unprotected sex and genital contact, can be prevented through safe sex methods; early detection and treatment of infection are important and, if left untreated, STI’s can lead to serious health consequences
	+ Outline the STI’s caused by: fungus, bacteria & virus (cause, symptoms, treatments)
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 20, 21******Pages 273-287, 289-301***STAWA STAGE 2: BODY WORKSAct 45: Birth ControlAct 46: STI’s other than HIV/AIDSAct 47: HIV/AIDS |  |
| **Week 10** | 7f. Reproductive Technologies &Ethics | **Reproductive Technologies:*** There are a range of techniques available to genetically screen embryos before implantation or during early development
	+ Describe the different techniques used: Ultrasound, Amniocentesis, Chorionic villus sampling, fetoscopy
* There are a variety of assisted reproductive technologies to help overcome infertility problems, but each has its limitations, risks and benefits
	+ Discuss the different treatments available to help infertile couples

**Ethics:*** Discuss the issues/ethics surrounding stem cells and IVF
* SHE: the use of genetic profiling and genetic screening adults and embryos have ethical considerations
 | ***TEXTBOOK: UNIT 1&2 HUMAN BIOLOGY ATAR******Chapter 18******Pages 235-237, 249-259***Act 28: Reproductive Technologies – DecisionsAct 50: Prenatal TestingAct 51: Maternal & foetal observations | **Extended Response: Contraception & STI’s****7.5%** |

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| **WEEK** | **TOPIC** | **OBJECTIVES & OUTLINE** | **RESOURCES/SUGGESTED ACTIVITIES/QUESTIONS** | **ASSESSMENTS & IMPORTANT DATES** |
| **Term 4,****Week 1** |  | *Revision/preparation for test and exams* | Past exam papers & Study Guide | **PERIOD ZERO:****Human Reproduction Test** **(Topic 7)****12.5%** |
| **Week 2** | **Assessment Free Week *-*** *Note: content may still be taught during this time* |
| **Weeks****3 + 4** | **SEMESTER TWO EXAMINATIONS** | **SEMESTER 2 EXAM** **40%** |