

# Biology 30 Study Guide – Major Concepts

## Study Tips

- ✓ Organize your notes
- ✓ Prioritize study areas (spend more time on your weakest areas)
- ✓ Re-read appropriate sections in the textbook if required.
- ✓ Use study-guides & online resources (Key, Alberta Education) and do lots of practice diploma question. If you don't know the answer, try to find it in your notes or textbook first)
  - <http://questaplus.alberta.ca>
  - [www.education.gov.ab.ca](http://www.education.gov.ab.ca)
- ✓ Check the school's website for tips on how to answer multiple choice questions and other helpful information.
- ✓ **Ask lots of questions – that's what I'm here for!**

## Unit 1 – Nervous System

- Structure of a Neuron
  - cell body, dendrites, membrane, neurilemma, axon, axon terminal, synapse etc
- Conduction of nerve impulses
  - Ion exchange
  - polarization, depolarization, repolarization
  - conduction of an action potential etc
- Myelination (Difference between grey matter and white matter etc)
- Neurotransmitters – (synapses, receptors, enzymes that break down neurotransmitters)
- Central Nervous System vs Peripheral Nervous System
- Brain Structure and Function (know which part does what)
  - Cerebrum, Brain Stem (Thalamus, Hypothalamus, Midbrain, Pons, Medulla Oblongata, Cerebellum)
  - Lobes (Frontal, Parietal, Temporal, Occipital)
- Somatic Nervous System
  - Reflex Arc (Receptors, Sensory neurons, inter-neurons, motor neurons, effectors)
- Autonomic Nervous System
  - Functions of and differences between the Sympathetic and Parasympathetic Nervous System
- The Eye
  - Know all the parts of the eye (review notes & text)
  - Review vision defects (myopia / glaucoma etc)
- The Ear
  - Know all the parts of the ear (outer, middle, inner)
  - Associated functions with sound & balance

## **Unit 2 – Endocrine System**

- Understand the meaning of homeostasis and the function of hormones in our body as they relate to homeostasis
- Different types of hormones: protein & steroid
- Specific Hormones and Glands – You should know the source, target and function of all the following hormones. You should also understand how they are regulated.
  - Pituitary Gland: (know how anterior and posterior relate to the hypothalamus)
    - Anterior: TSH, ACTH, GH, FSH, LH, PRL
    - Posterior: ADH, Oxytocin
  - Adrenal Gland
    - Cortex: Aldosterone, Cortisol
    - Medulla: Epinephrine, Norepinephrine
  - Pancreas:
    - Glucagon, Insulin
    - Understand cause of diabetes etc
  - Thyroid Gland: Thyroxine, Calcitonin
  - Parathyroid Gland: Parathyroid Hormone
  - Testes: Testosterone
  - Ovaries: Estrogen, Progesterone

## **Unit 3 – Reproduction & Development**

- Structure of the Male Reproductive System
  - Ureter, Vas Deferens, Seminal Vesicles, Epididymis, Testes, Ejaculatory Duct, Prostate, Cowpers Gland, Urethra, Seminiferous Tubules etc)
- Hormonal regulation of male reproductive system (FSH, LH, Testosterone)
- Spermatogenesis
- Sperm composition, Spermatozoa structure and function
- Structure of the Female Reproductive System
  - Fallopian Tubes / Oviducts, Uterus, Cervix, Vagina, Anus, Ovary, Clitoris, Hymen, etc)
- Hormonal control of the female reproductive system
  - Menstrual Cycle (Follicular phase, Ovulation, Luteal Phase)
  - FSH, LH Cycles
- The process of fertilization (how long, where etc)
- Embryonic Development (Zygote, Blastula, Implantation etc)
- Fetal Development (Stages, Placenta, medical technologies)
- Birth (hormones involved etc)

## **Unit 4 – Molecular Genetics**

- DNA Structure, Chromosomes, Gene, Locus, Allele
- Structure and Discovery of DNA
- DNA Replication – Semi-conservative Replication
- Protein Synthesis
  - Transcription: From DNA to mRNA
  - Translation: From mRNA code to Protein / Polypeptide
- Mutations
  - Point mutations, frame shift mutations etc
- DNA Technology
  - Restriction Enzymes, Ligases
  - Gel Electrophoresis
  - Recombinant DNA
  - DNA Fingerprinting
  - Plasmid Transformation

## **Unit 5 – Classical Genetics**

- Mitosis and Meiosis (Cell Division)
  - Interphase
  - Prophase, Anaphase, Metaphase, Telophase
  - Chromatids, Tetrads, Homologous Chromosomes, Centrioles, Spindle Fibres etc)
  - Crossing Over
  - Non-Disjunction (Trisomy, monosomy)
- Karyotypes
- Mendel's Laws of Heredity
- Crosses, Punnet Squares
  - Terminology: Genotype, Phenotype, Homozygous Recessive, Homozygous Dominant, Heterozygous
  - Monohybrid Crosses
  - Test Crosses
  - Multiple Alleles Crosses
  - Incomplete and Co-Dominance
  - Dihybrid Crosses
  - Sex-Linked
- Gene Mapping
  - Crossing over & how distance between genes affects their ability to be passed on together
- Pedigrees

## **Unit 6 – Population Biology**

- Hardy-Weinberg Equation & Conditions
- Population Growth Rates (natality, mortality, immigration, emigration)
- Population densities
- Open and Closed populations
- R-selected and K-selected populations
- Carrying Capacity
- Interspecific and Intraspecific Competition
- Relationships: Predation, Mutualism, Commensalism
- Succession & Climax Communities

**Please come to the review prepared with questions or specific areas of concern.**

**Happy Studying!**