

Biology 30 Work Plan

Units / Topics	Time Frame	Major Learning Outcomes	Resources / Possible Assessments
<p style="text-align: center;">Unit 1</p> <p style="text-align: center;">Chemical Basis of Life</p>	<p style="text-align: center;">10 Hrs.</p>	<ul style="list-style-type: none"> • Appreciate the basic principles of chemistry which are involved in life processes <ul style="list-style-type: none"> ○ Recognize that organisms are made of atoms ○ Recall the relationship between electrons and the types of bonds they form ○ Relationship between chemical bonds and stored energy ○ Recognize the importance and ongoing nature of chemical reactions in the body ○ Chemical reactions: synthesis and decomposition reactions and the relationship with homeostasis • Properties of carbohydrates, lipids and proteins <ul style="list-style-type: none"> ○ Interaction of molecules through hydrogen bonding ○ Compare mono-, di- and polysaccharides and their usefulness in living systems ○ Relationships between fatty acids and fats, and usefulness in living systems ○ Relationships between amino acids and proteins with reference to peptide bonds ○ Discuss enzymes and terminology: substrate, enzymes, factors affecting enzyme activity ○ Components of a fat molecule ○ Value of proteins with reference to the human body 	<ul style="list-style-type: none"> • MHR: Biology Textbook • Page 40 – 48, 354 - 358 • Lab activity for identifying fats, lipids and proteins (pg. 356 – 357: Testing for Macromolecules) • Review of science 9 / 10 chemistry units • Assignments: <ul style="list-style-type: none"> ○ Questions sheets ○ Poster on each of the types of molecules • Unit test
<p style="text-align: center;">Unit 2</p> <p style="text-align: center;">Cell Structure and Function</p>	<p style="text-align: center;">10 Hrs.</p>	<ul style="list-style-type: none"> • Describe the structure and functions of cell components <ul style="list-style-type: none"> ○ Evidence for the existence of cells ○ Observe, sketch and describe representative plant and animal cells ○ Describe the structure of the cell membrane ○ Functions of organelles in eukaryotic cells ○ Contrast eukaryotic vs. prokaryotic cells 	<ul style="list-style-type: none"> • MHR: Biology textbook and other resources will be used <ul style="list-style-type: none"> ○ Chapters 1, 2, 3 ○ Teacher’s own notes • Lab to observe and draw plant / animal cells • Diffusion / osmosis lab activity

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		<ul style="list-style-type: none"> • Explain the processes of diffusion, active transport, photosynthesis and respiration <ul style="list-style-type: none"> ○ Factors affecting diffusion ○ Osmosis and diffusion in living organisms ○ Mechanics of active transport and transport proteins ○ Energy use in cells (ATP- ADP) and (NAD-NADH) ○ Aerobic vs. anaerobic metabolism ○ Compare / contrast photosynthesis and respiration ○ Structure of a leaf in photosynthesis ○ Importance of light and dark reactions 	<ul style="list-style-type: none"> • Poster of the cell and organelle function • Assigned questions • Unit test
Unit 3 Genetics	20 Hrs.	<ul style="list-style-type: none"> • Explain the significance of Mendel's experiments and observations and the laws derived from them <ul style="list-style-type: none"> ○ Laws of segregation and independent assortment ○ Mendel's observations and experiments ○ Dominant vs. recessive traits ○ Punnett squares for mono- and dihybrid crosses • Relationships among chromosomes, genes and DNA <ul style="list-style-type: none"> ○ Genetic code and DNA ○ Process of DNA replication ○ Compare mitosis and meiosis ○ Protein synthesis (transcription/ translation) ○ Chromosomal and gene mutations ○ Sex-linked traits & genetic disorders ○ Somatic vs. sex chromosomes ○ Sexual vs. asexual reproduction • Impact of biotechnology on society <ul style="list-style-type: none"> ○ Recombinant DNA production ○ Uses of recombinant DNA ○ Genetic screening techniques ○ Implications of genetic screening 	<ul style="list-style-type: none"> • MHR: Biology <ul style="list-style-type: none"> ○ Chapter 14, 16, 17, 18, 20 • Hand-outs from NL curriculum document on asexual reproduction modes • Genetics worksheets • Genetics labs, constructing a DNA molecule • DNA replication lab • Hardy-Weinberg lab • Unit Test

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		<ul style="list-style-type: none"> • Application of population genetics to evolution <ul style="list-style-type: none"> ○ Deme and gene pool ○ Hardy-Weinberg principle ○ Genetic drift and factors affecting genetic drift ○ Mutations in a population 	
Unit 4 Animal Systems	20 Hrs.	<ul style="list-style-type: none"> • Describe how nutrients and oxygen are moved around the body cells <ul style="list-style-type: none"> ○ Review diffusion/ active transport systems ○ Compare circulatory systems (1, 2, 3, and 4-chambered hearts) ○ Blood circulation patterns • Explain functioning of human Circulatory system <ul style="list-style-type: none"> ○ Role of organs in circ. System ○ ABO blood typing / Rh factors ○ Immune system & HIV ○ Research the use of artificial hearts, heart transplants, circulation machines, etc. ○ Discuss respiration by relating the activity to the lungs and cells fed by the blood • The nervous system <ul style="list-style-type: none"> ○ Structure of a neuron and nerve transmission (action potential) ○ Comparison of nervous systems between planaria, earthworm and humans ○ Central nervous system vs. peripheral nervous system ○ Compare brains of reptiles and humans • The endocrine system <ul style="list-style-type: none"> ○ General structure of hormones (steroid / non-steroid hormones) ○ The pituitary gland and its role on the other body systems ○ Relationship between insulin and the control of 	<ul style="list-style-type: none"> • MHR: Biology <ul style="list-style-type: none"> ○ Chapter 15, 16 and teacher's own resources • Blood typing lab (may be virtual) • Reflex lab activity (in lab) • Menstrual cycle lab activity (done on computer) • Questions will be assigned throughout each section • Presentation / Poster / Research will be done on each of the technologies used in circulatory system • Class may be asked to create a chart illustrating the different technologies involved in reproduction • Charts / diagrams outlining the major roles of glands in the body and the roles of the hormones they produce • Compare and contrast charts /

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		<ul style="list-style-type: none"> ○ blood-glucose levels – 2 forms of diabetes ○ Functions of hormones from other glands ● Reproductive system <ul style="list-style-type: none"> ○ Sexual vs. asexual reproduction ○ External vs. internal fertilization ○ Describe fertilization in an earthworm ○ Compare the amniotic egg of reptiles/ birds with the structures in the uterus of a pregnant female ○ Describe semen production in humans ○ Menstrual cycle → implantation or menstruation ○ Biofeedback mechanisms ○ Embryonic development ○ Birth control & contraception ○ Relationship between diet and health of mother with the developing fetus ○ Reproductive technologies (amniocentesis, IVF, fertility drugs, genetic screening, etc.) 	<p>presentations relating human biology with other species</p> <ul style="list-style-type: none"> ● Possible dissection lab if time permits and materials are available ● Unit tests
Unit 5 Evolution	15 Hrs.	<ul style="list-style-type: none"> ● Explain how evolutionary theory unifies biology <ul style="list-style-type: none"> ○ How do different variations form? ○ Action of natural selection on individuals, populations and species ○ How Darwin's observations led to inferences about evolution ○ Compare different "theories" about evolution (ex. Lamarck, DeVries, Weisman) ● Evidence of evolutionary theory <ul style="list-style-type: none"> ○ Use of fossil record to create lines of phylogeny ○ Comparative anatomy and embryology ○ Evolution documented in Earth's history ○ Theory of continental drift in creating new organisms ○ Broad climatic changes during Earth's history (ice ages, melting of ice caps, etc) ○ Effects of migration and mutations on 	<ul style="list-style-type: none"> ● MHR: Biology textbook <ul style="list-style-type: none"> ○ Ch. 19- 21 and teacher's own resources ● Hardy-Weinberg lab activity ● Research / presentation – How have different organisms changed over time ● Assignment sheets ● Unit test

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		evolutionary change	
		<ul style="list-style-type: none"> • Discuss how Evolution proceeds <ul style="list-style-type: none"> ○ Gradualism vs. punctuated equilibrium ○ Implications of the Hardy-Weinberg equilibrium ○ Isolation in speciation ○ Pre- and post-zygotic barriers to reproduction ○ Speciation and the development of humans 	
Optional Unit Expand core Unit Or Independent Study	Remaining time	<ul style="list-style-type: none"> • Time will most likely be used to expand on existing unit • In addition, students will be completing weekly blog posting on topics of their choice which contribute to independent study 	

Marking Scheme

Biology in the News (Weekly blog post)	10%
Assignments/ labs/ Research	25%
Unit Tests	25%
Departmental Exam	40%