# HONORS BIOLOGY STUDY GUIDE FOR FINAL EXAM - 2018

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>INFORMATION FOUND*</th>
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<tbody>
<tr>
<td>♦ GENETICS UNIT</td>
<td>Chapters 10, 11, 12, 13 and 14</td>
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</table>

- **Cell size limitations**: diffusion, DNA, surface area to volume ratio
- **Cell reproduction**: asexual, sexual, chromatin, chromosome
  - The cell cycle: interphase and mitosis, know phases, what happens in each, cleavage furrow, regulation of, cyclins, cancer: uncontrolled cell division, metastasis
- **Cell differentiation**: definition of, embryo, blastocyst stem cells, totipotent, pluripotent, multipotent, stem cell research, embryonic stem cells
- **Gregor Mendel and heredity**: genes, alleles, locus, dominant, recessive, phenotype, genotype
  - Mendel’s two laws, homozygous and heterozygous, monohybrid/dihybrid crosses, offspring ratios, probability
- **Patterns of heredity**: simple dominance, incomplete dominance, codominance, multiple alleles, pleiotropy, polygenic inheritance, environmental influences
- **Meiosis** – formation of gametes, phases of and what happens in each, haploid vs. diploid, homologous chromosomes, crossing-over, recombination, chiasma, synapse, linked genes, gene maps
- **Patterns of heredity in humans** (eg. ABO types)
  - X-linked traits, autosomes, sex chromosomes, karyotype, chromosomal abnormalities, nondisjunction, Downs' Syndrome, etc.
  - how to determine genotypes and phenotypes: testcrosses, pedigrees, carriers
- **DNA**: Griffith and transformation, Hershey/Chase experiments
  - Double helix: Watson, Crick, Franklin
  - structure and function: nitrogen bases, base-pairing rule, deoxyribose and phosphate backbone, nucleotide, base pair, hydrogen bond, DNA replication, DNA polymerase, origins of replication
- **Genetic code, codons**, what do they code for?
  - Know how to use the table on page 367
- **RNA transcription**, translation, RNA editing
- **Mutations**: *types* and how they affect proteins
### EVOLUTION, NATURAL SELECTION UNIT

**Charles Darwin, voyage on HMS Beagle, Galapagos**

- Hutton, Lyell – influences on Darwin
- Lamarck, acquired traits
- Evolution, natural selection, descent with modification
- How selection acts, evidence of selection, homologous and analogous structures, vestigial structures, embryology

- Selection acting on single gene and polygenic traits,
- Directional, stabilizing and disruptive selection,
- Speciation, micro- versus macroevolution,
- biological species concept, pre- and postzygotic barriers,
- Taxonomy, binomial nomenclature, dichotomous keys
- Levels of classification: Domain down to Species,
- The Six Kingdoms of Life, characteristics of each, determining evolutionary relationships, the three domains

**Text 450-473**

**Chapter 16 Worksheets**

**Teddy Graham Selection Lab**

**Text 487-489**

**Chapter 17 Worksheets**

**Text 510-528**

**Chapter 18 Worksheets**

**Dichotomous Key Lab**

**Text 538-563**

**Chapter 19 Worksheets**

### THE DIVERSITY OF LIFE UNIT

**Viruses: structure, host specificity, bacteriophages,**

- Lytic vs. lysogenic cycles, retrovirus, viroids, prions

**Text 574-579, 588-592**

**Ch 20-1 Worksheet**

**Archaea and Bacteria: types, modes of nutrition,**

- Know structure of a bacterial cell,
- reproduction by binary fission and conjugation
- Shapes: Coccus, bacillus and spirillus,
- microbiome, symbiosis, ecological impact, diseases

**Text 580-588**

**Ch 20-2 Worksheet**

**Characteristics of animals, animal development:**

- blastula, gastrula, germ layers, symmetry
- development of body cavities

**Text 730-743**

**Origin, Cambrian explosion, adaptive radiation**

**Invertebrates: characteristics of selected phyla,**

- evolutionary overview, echinoderms

**Text 752-756**

**Vertebrates: characteristics of selected phyla,**

- evolutionary overview, chordates, amniotes, adaptations to land

**Text 757-764**
*ALL TOPICS HAVE LECTURE MATERIAL on POWERPOINT, also REVIEW ALL QUIZZES AND TESTS

* The format of the final exam will be similar to tests, including multiple choice, matching, Punnett square problems and short answer questions.