

# Biology Semester 2 District Exam Study Guide

## Evolution Learning Targets

1. I can summarize the major concepts of natural selection:
  - Differential survival and reproduction
  - Chance inheritance of variation
  - Environment selects for specific traits
  - Mutations are the raw material for change
2. I can describe how natural selection is a mechanism for evolution by explaining how a new species originates.
3. I can explain how natural selection leads to organisms that are well suited for their environment.
4. I can explain how genetic variation is preserved or eliminated from a population through natural selection.
5. I can explain why having a great diversity of species increases the chance that at least some living organisms will survive in the face of cataclysmic changes in the environment.
6. I can summarize the relationships between present day organisms and those that inhabited the Earth in the past by using the fossil record, anatomy (homologous structures), and molecular similarities.
7. I can explain that the degree of relatedness between organisms or species can be estimated from similarity or their DNA and protein sequences.

## Genetics

1. I can **identify** and **describe** homologous chromosomes with **homozygous** or **heterozygous** alleles.
2. I can **draw** and **label** homologous chromosomes with **homozygous** or **heterozygous** alleles.
3. I can describe the difference between **dominant** and **recessive** alleles.
4. I can state the difference between a **genotype** and a **phenotype**.
5. I can use a Punnett Square to **predict** all of the possible genotypes and phenotypes of the offspring when crossing two parents with a specific trait.
6. I can describe the different inheritance patterns for:
  - Complete Dominance
  - Incomplete dominance
  - Codominance
  - Sex – Linked
7. I can identify traits that are polygenic.
8. I can use a pedigree to determine the inheritance pattern.

## DNA

1. I can describe the structure and function of DNA.
  - including the types of bonds
2. I can describe the structure and function of RNA.
3. I can explain the complementary base pair rules.
4. I can predict the consequences that changes in DNA may have on an organism.
5. I can demonstrate how the genetic information in DNA molecules provides instructions for assembling protein molecules.
6. I can describe the processes of transcription and translation in making proteins.
7. I can read/use the Amino Acid chart to decode codons.

## Cell division

### B4.3A Learning Targets:

- I can compare and contrast mitosis and meiosis and describe key differences between them.
- I can compare and contrast sexual and asexual reproduction and state advantages and disadvantages of each.
- I can explain why offspring resemble their siblings and parents.
- I can list the phases of meiosis I and meiosis II and describe the events characteristic of each phase.

I can identify the phases of meiosis I and meiosis II from diagrams or micrographs..  
I can explain how the end result of meiosis differs from mitosis.

**B4.3B Learning Targets:**

I can describe how a mutation in a gamete will be passed on to the offspring.  
I can describe how a mutation in a body cell has a different result than a mutation in a sex cell.

**B4.3C Learning Targets:**

B4.3C 1: I can use a karyotype to identify possible genetic defects in an offspring.

**B4.3d Learning Targets:**

I can define independent assortment and crossing over and what happens in each.  
I can explain why offspring are not identical to their siblings and parents due to crossing over, independent assortment and random fertilization.

**B4.3e Learning Targets: (Honors)**

I can recognize and describe processes that contribute to genetic variation such as: crossing over, deletions, insertions and duplications of genes.  
I can explain how independent assortment, crossing over, and random fertilization contribute to genetic variation in sexually reproducing organisms.

**B4.3g Learning Targets (Honors)**

B4.3g 1: I can explain that cellular differentiation results from gene expression and or environmental influences.