**Biology Review Guide**

**Meiosis, Non-disjunction, Fertilization & Differentiation, and Chromosomes & Karyotypes**

**Meiosis**

* Identify (name) and describe the eight phases of meiosis (PMAT I and PMAT II)
  + What structures are involved during each step?
  + What shape/form is the DNA in during each stage?
  + What events/processes (2) contribute to genetic variability in the daughter cells?
  + How many chromosomes does each daughter cell have by the end of meiosis? (You can use humans as an example, but in general how many chromosomes would it have compared to the parent cell?)
* Compare and contrast the processes of mitosis and meiosis
  + Consider the following characteristics –
    - number of chromosomes in daughter cells compared to parent cell (diploid or haploid),
    - number of daughter cells,
    - type of daughter cells,
    - involved in what type of reproduction,
    - number of phases,
    - events within stages.
  + How are the GOALS of meiosis and mitosis different?

**Non-disjunction, Fertilization, and Differentiation**

* Define non-disjunction
* Identify the stages of meiosis in which non-disjunction could occur
* Describe how daughter cells of meiosis would be different if non-disjunction occurred
  + What does (n+1) and (n-1) refer to? How is this different from (2n+1) and (2n-1)
  + In what cases would the cells or individuals not be able to survive?
  + Are there cases that they would survive? What are these?
* Define and **briefly** describe oogenesis and spermatogenesis
  + How are they different from each other (location, process)?
  + How many useable eggs are produced to useable sperm?
* Define fertilization
  + How does fertilization restore the diploid number in humans (and other diploid organisms)?
* Describe the difference between zygote, embryo, and fetus
* Define differentiation
  + How do you think having different specialized cells help an organism be more efficient?

**Chromosomes and Karyotypes**

* Explain the difference between the different forms of DNA and identify the stages in which they are present
  + What is chromatin?
  + What is the difference between a double stranded chromosome and a single stranded chromosome?
  + What are sister chromatids?
  + What are homologous chromosomes?
* Identify the two types of chromosomes
  + How many are there of each?
  + Which combination of sex chromosomes would result in a human male? Human female?
* Identify the two types of cells
* Explain the difference between a diploid and haploid cell
  + What types of cells are diploid and what types are haploid?
  + What does the notation 2n and n mean?
* Describe a karyotype
  + What can it be used to identify?
* Define aneuploidy
* Distinguish between monosomy and trisomy
  + What are examples of chromosomal disorders in humans that are caused by monosomy and trisomy? (Need to know Turner’s syndrome, Down syndrome, and Klinefelter’s syndrome)