Source: KBBiologyMasterIndex

1 | Mutation and Inheritance

1.1 | Cell Division, Cell Cycle & It's Regulation

- Each cell lives and reproduced on a cycle; unsurprisingly, this is called the KBhBIO101CellCycle!
- At the end of the cell cycle, a little bit of a thing happens where the cell replicates (or makes offsprings, so not necessarily exact copies of) itself. This bit of a thing's called KBhBIO101CellReproduction.
    - This reproduction process uses one of either KBhBIO101Mitosis (exact copy, for somatic cells (not sperm/egg) only) or
    - KBhBIO101Meiosis (half, randomly-mixed genetic info, for gametes (sperm/egg) only).
- The purpose and activities of each cell cycle phase
- The importance of cell cycle checkpoints
- The types and functions of cell cycle regulators
- The organization of the human genome:
    - The idea that genes and regulatory sequences are located on chromosomes
    - The number of unique human chromosomes and how many chromosomes are in each somatic cell or gamete.
    - The concept of alleles: what they are, their relation to genes and traits
- The types of reproduction and how they relate to genetic variation
    - Asexual
    - Sexual
        - Difference between germline and somatic cells and how this relates to reproduction
- The causes and consequences of mutations
    - How different kinds of damage or mistakes can lead to mutation
    - Different types of mutations at various scales, and how those could potentially impact proteins
    - The connection between mutations and variations in traits/phenotypes
- Meiosis as the mechanism that enables sexual reproduction and increases genetic variation in sexually reproducing organisms
    - The purpose and activities of meiosis I and meiosis II, esp:
        - Crossing over
        - Independent assortment
        - diploid haploid chromosome reduction
    - How meiosis differs from mitosis
    - Mechanisms for genetic variation in offspring as compared to asexual reproduction
- Genetics and inheritance
    - Connecting sequence variation at the DNA level to protein function
    - Connecting protein function to expressed traits in organisms
        - Given an individual with two particular alleles of a gene, what trait would you expect to see.
    - Connecting protein function and traits to inheritance patterns:
        - Given parents with particular alleles of genes, what would you expect in their offspring and why.