

Source: [KBiologyMasterIndex](#)

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.