Compare the Similarities and Differences between Meiosis and Mitosis

Purpose & Role:

Both mitosis and meiosis involve nuclear division that results in the formation of new cells for the creature. This is one of the seven characteristics of living being, the ability to reproduce. However, there are significant differences between the two types of division. Mitosis is used in asexual reproduction for growth, repair and replacement that contributes to the development of the organism. Meiosis, on the other hand, provides haploid gametes for sexual reproduction between two organisms, thus generate genetic differences between parent and offspring.

Products of the two types of division:

Mitosis allows the formation of two daughter cells that are genetically identical to the parent cell, with the same amount of chromosomes and identical genetic material. These daughter cells are clones to the parent cell. On the other hand, meiosis provides gametes that contain only half the number of chromosome number of an adult cell so that when gametes fuse together in fertilization, a diploid zygote is formed. Genetic materials in daughter cells of meiosis are slightly different to adult cell due to variation from independent assortment and crossing-over of meiosis.

Overview of different phases:

Both mitosis and meiosis consists of four main phases: prophase, metaphase, anaphase & telophase. For mitosis: During Prophase, nuclear membrane of parent cell disappears while DNA condenses to form two identical chromatids attached at the centromere. In Metaphase, Chromosomes lines up across the equator of cell with spindle apparatus attaching to the centromere. In Anaphase, separation of chromatids is achieved by the contraction of spindle apparatus, pulling chromosomes to opposite poles towards centrioles. In Telophase, chromosomes diffuse into chromatin while nuclear membrane and nucleoli reform. Meiosis also has all these four phases however, these four phases happen twice in the process. Though meiosis-2 is exactly the same as mitosis phases, with the purpose to