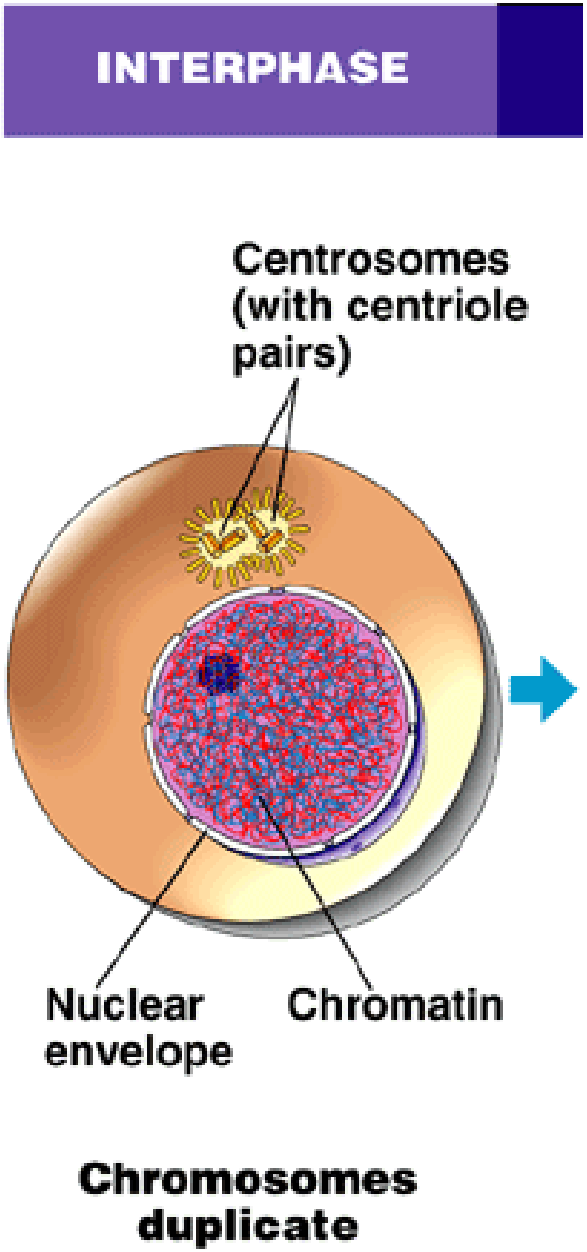
Meiosis

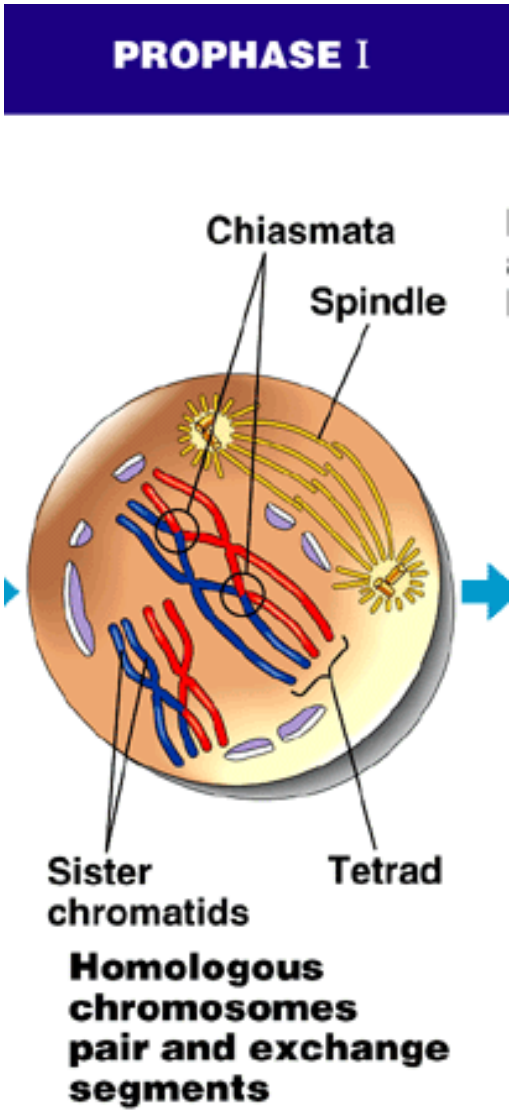
Stages of meiosis

- Interphase: each DNA replicates to produce two genetically identical sister chromatids which are attached at the centromere
  - *This is DNA replication – remember helicase, single stranded binding proteins, DNA polymerase, leading strand, lagging strand, Okazaki fragments, and ligase*

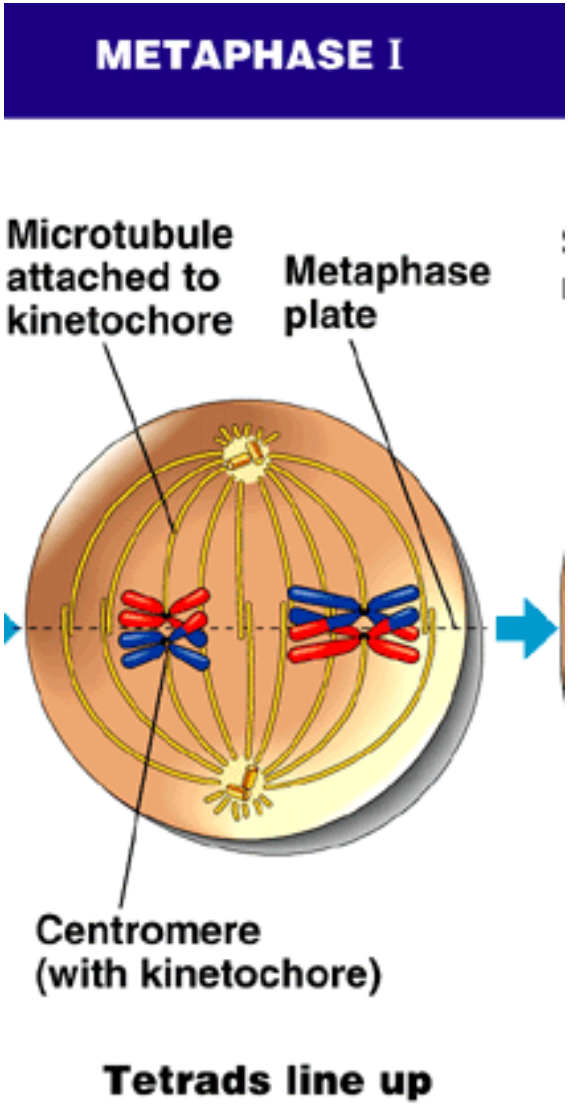


Meiosis I separates the homologous chromosome pairs

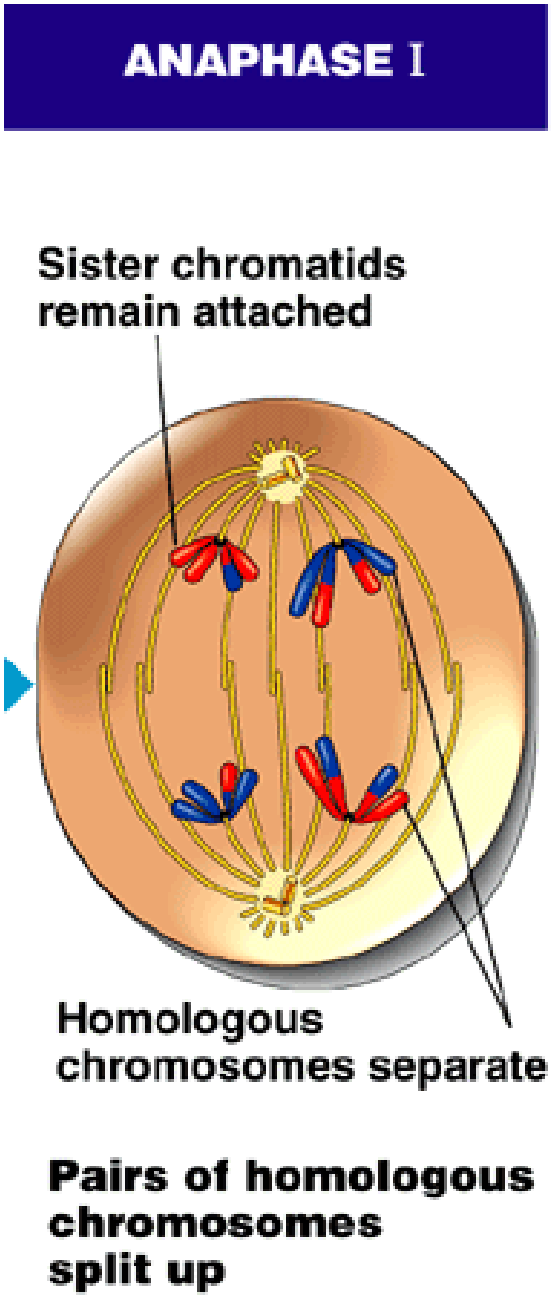
- Prophase I:
  - Chromosomes condense
  - Homologous chromosome pair to form a tetrad
    - One member of the pair is from the mom, the other from the dad
    - A tetrad is the association of four chromatids (two from each homologue)
    - The homologous chromosomes are attached at chiasmata
  - Spindle microtubules form and the nuclear envelope disappears



- Metaphase I
  - Tetrads align at the equator of the cell
  - Spindle fibers attach to the centromere region of each homologous chromosome pair.

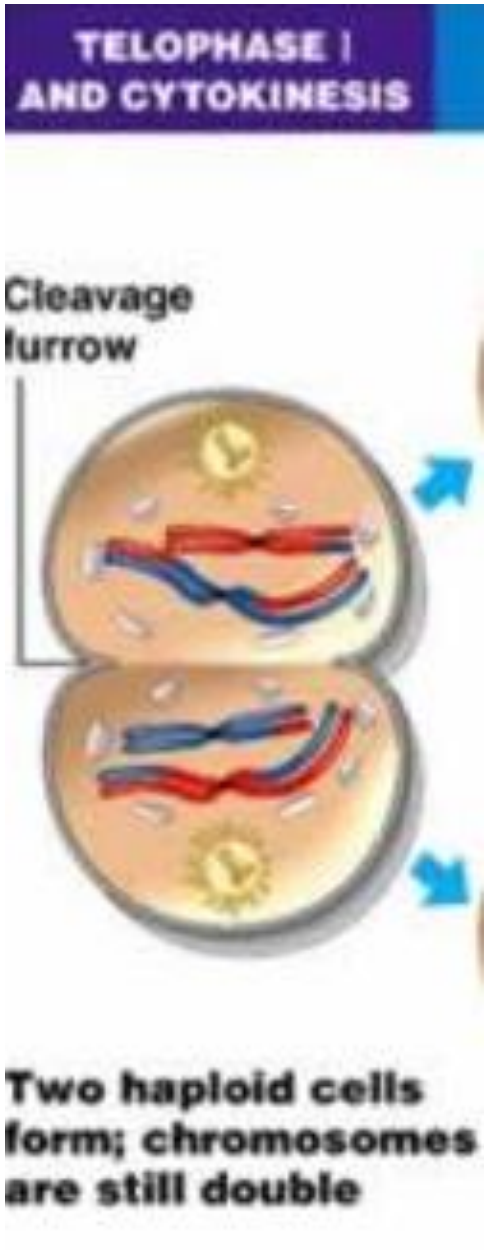


- Anaphase I:
  - Homologous chromosomes separate and move to the poles
  - Sister chromatids remain attached at their centromere and move as a single unit towards the same pole
  - Each pole randomly receives a mixture of maternal and paternal chromosomes



- Telophase I: chromosomes decondense, nuclear membrane may reform

- Cytokinesis occurs, forming two haploid daughter cells (remember cleavage furrow and cell plates)



Meiosis II separates the two sister chromatids of each chromosome

- Prophase II:
  - Chromosomes recondense and spindle fibers reform
  - Chromosomes progress towards the equator

- Anaphase II:
  - Centromeres of sister chromatids separate
  - Sister chromatids of each pair, now individual chromosomes, move towards opposite poles of the cell

- Telophase II: nucleus reforms

- Chromosomes de-condense.

- Cytokinesis results in four haploid daughter cells