I. Meiosis

Nucleus of parent cell divides \( \rightarrow \) four daughter nuclei

Meiosis allows for differences in inherited characteristics

A. Interphase similar to mitosis

B. Prophase I
   1. similar to mitosis but with important differences
   2. chromosomes (chromatids) pair-up side by side
      a. members of each pair do not have identical DNA
      b. 22 homologous pairs (autosomal)
      c. one pair of sex chromosomes
   3. each pair has two chromosomes composed of 2 chromatids each

C. Metaphase I
   1. pairs line up
   2. randomly arranged
      - independent assortment

D. Anaphase I
   1. members of each pair become separated
   2. chromatids do not separate

E. Telophase I
   1. each chromosome still exists as 2 chromatids attached by a centromere
   2. 23 chromosomes (duplicated) at each pole of cell
   3. nuclear membrane forms around each set of 23 chromosomes
   4. Meiosis I completed

II. Meiosis II --- both meiosis I nuclei divides into two daughter nuclei

A. Similar to the 4 phases of mitosis
   1. chromosomes condense and line up
   2. centromeres split and chromatids separate
   3. chromatids now individual chromosomes
4. the four daughter nuclei now have 23 chromosomes each
   - haploid
5. telophase and cytokinesis

B. Union of 2 gametes restores diploid number

III. Cancer
   - uncontrolled growth ----> invasive

A. Tumors
B. Metastases

C. Loss of cell cycle control

D. Mechanisms (usually from genetic mutations)
   1. too many receptors for growth factors
      HER-2

   2. remove “brakes”
      Rb gene

   3. remove “inspectors”
      - p53 (tumor suppressor)