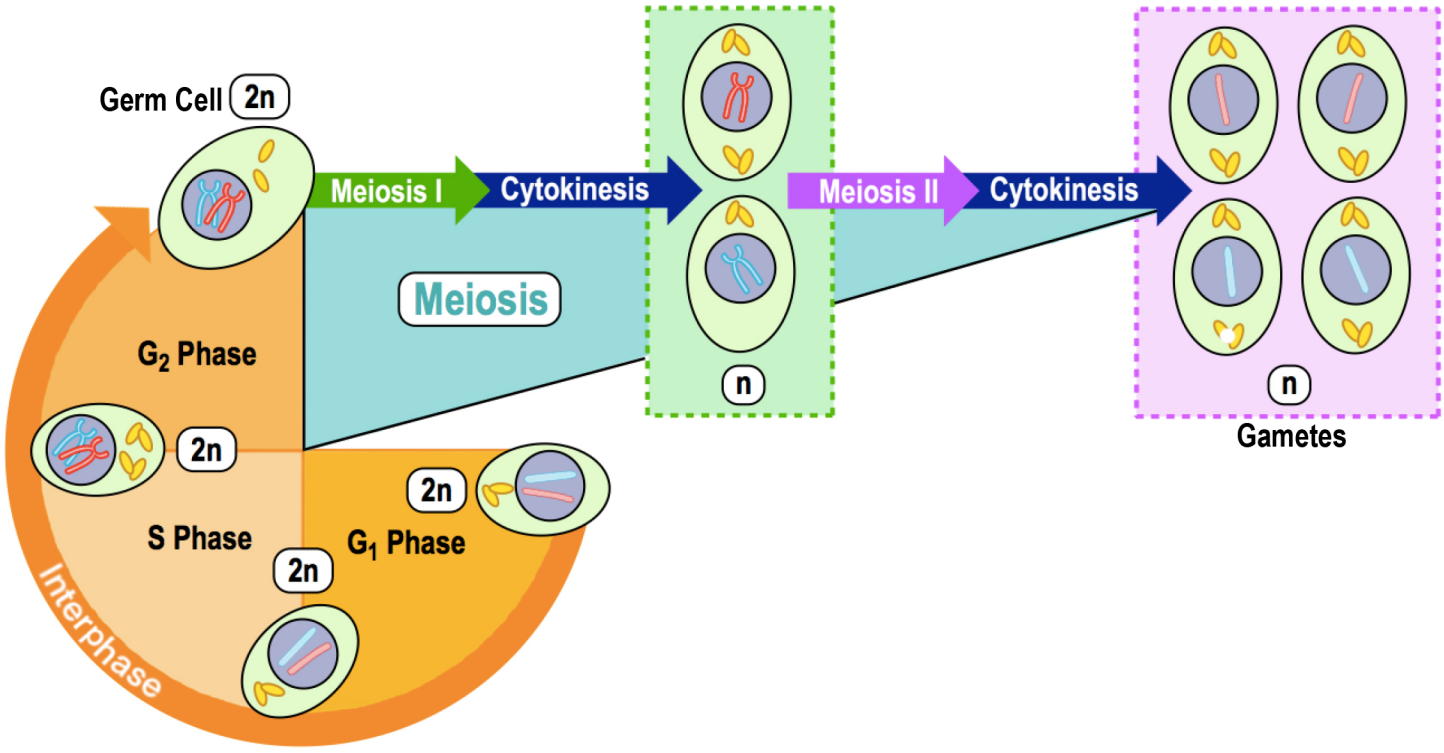
TOPIC: MEIOSIS

CONCEPT: INTRODUCTION TO MEIOSIS

●Before meiosis, a diploid cell must replicate its DNA & make proteins for cell division in _____.

●Meiosis starts with a *diploid* _____ *cell* & ends with _____ genetically *diverse* _____ gametes.

□ **Germ Cells:** _____ cells that are the *precursor* for making *gametes* (sperm or egg).



EXAMPLE: The process of meiosis produces:

a) 2 diverse haploid gamete cells.

b) 2 identical diploid gamete cells.

c) 4 identical diploid germ cells.

d) 4 diverse haploid gamete cells.

e) 4 identical diploid gamete cells.

PRACTICE: Which of the following steps must occur before Meiosis I in germ cells?

a) The DNA of the haploid cell is replicated.

b) The RNA of the diploid cell is replicated.

c) The DNA of the diploid cells is replicated.

d) The two cells need to be physically separated by cytokinesis.

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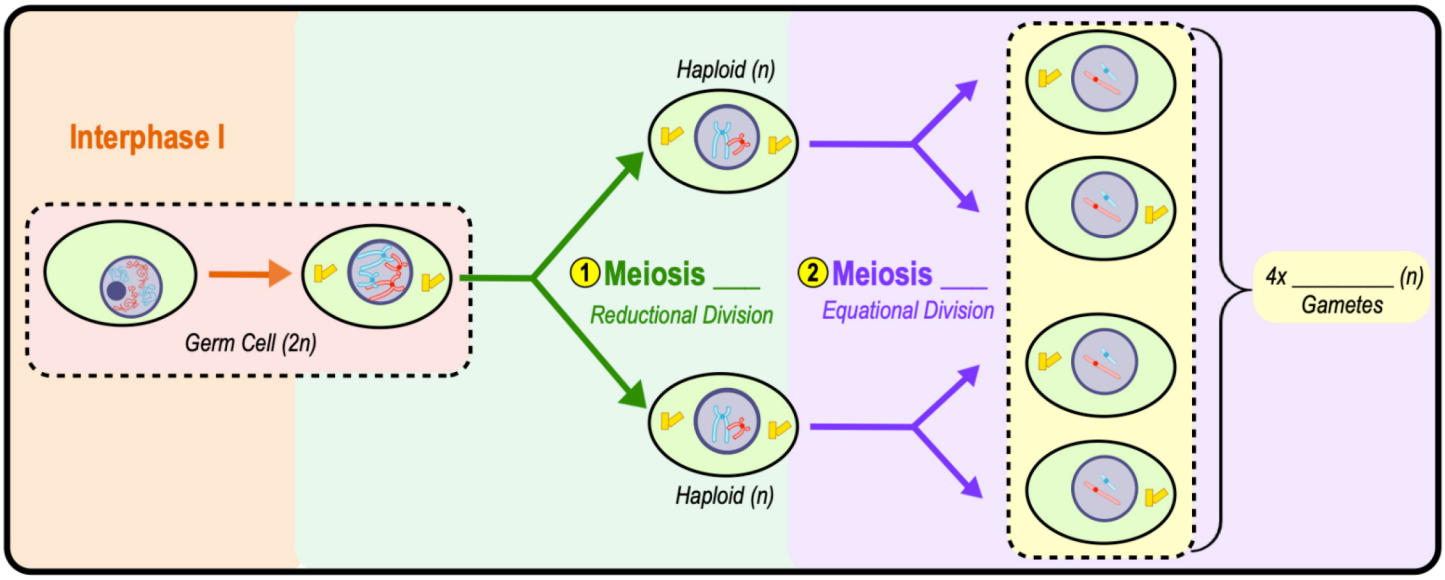
CONCEPT: INTRODUCTION TO MEIOSIS

- *Meiosis* is broken down into _____ rounds of cell division:
  - (1) **Meiosis I** *(Reductional Division):* *reduces* ploidy by separating *homologous* _____.
    - □ *Diploid* (2*n*) germ cell divides into _____ *haploid* (*n*) daughter cells.
  - (2) **Meiosis II** *(Equational Division):* maintains *equal* ploidy by separating *sister* _____.
    - □ *Haploid* (*n*) cells from meiosis I divide producing _____ genetically *diverse* haploid (*n*) gametes.

EXAMPLE: Meiosis I & Meiosis II.



PRACTICE: In Meiosis II, _____ cells are divided into 4 _____ daughter cells.

a) Diploid; Haploid.

b) Haploid; Diploid.

c) Haploid; Haploid.

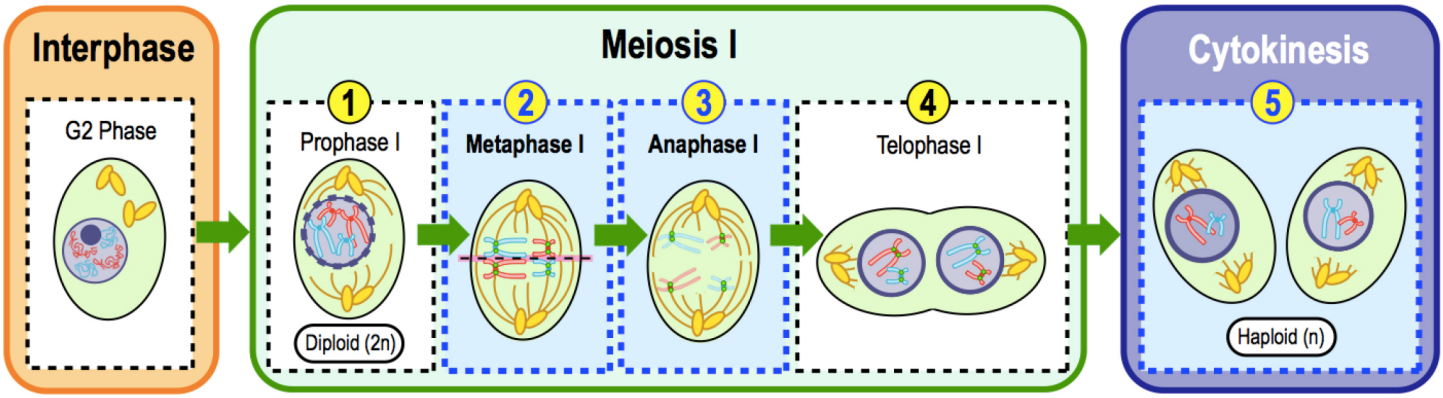
d) Diploid; Diploid.

TOPIC: MEIOSIS

CONCEPT: MEIOSIS I

- **Meiosis I** has _____ steps to Mitosis, but differs significantly in _____ I & _____ I:
  - □ In Metaphase I, *homologous chromosomes* are paired & aligned in _____ rows in the *middle* of the cell.
  - □ In Anaphase I, _____ chromosomes are separated while sister chromatids remain connected.
  - □ After Telophase I, *cytokinesis* produces _____ *haploid* (*n*) daughter cells that can then begin *Meiosis* _____.

EXAMPLE: Meiosis I.



PRACTICE: A daughter cell is created by meiosis I and the first round of cytokinesis. This daughter cell is just beginning meiosis II. Which of the following is an appropriate description of this daughter cell's genetic contents?

a) It has half the amount of DNA as the parent cell.

b) It has half the chromosomes but twice the DNA of the parent cell.

c) It has one-fourth the DNA and one-half the chromosomes as the parent cell.

d) It is genetically identical to the parent cell.

TOPIC: MEIOSIS

CONCEPT: MEIOSIS II

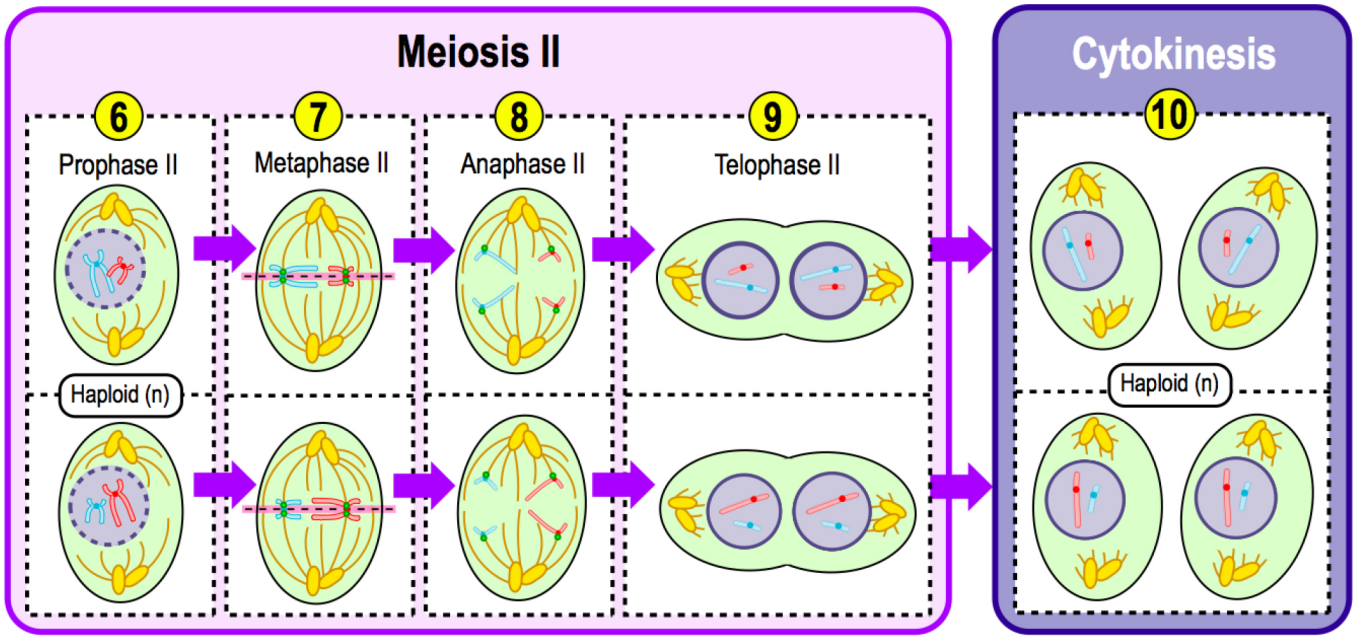
●In **Meiosis II**, each *haploid* cell produced in Meiosis I divides, forming _____ genetically *diverse,* haploid gametes.

●In terms of the events that occur in each phase, **Meiosis II** is *almost* exactly the same as mitosis.

□ Similar to Mitosis, chromosomes align in _____ row in Metaphase II

□ Also, similar to Mitosis, *sister* _____ are divided in Anaphase II.

EXAMPLE: Meiosis II.



PRACTICE: During which of the following stages of meiosis do homologous chromosomes pair up and align along the metaphase plate of the cell?

a) Metaphase I of meiosis.

b) Telophase I of meiosis.

c) Anaphase I of mitosis.

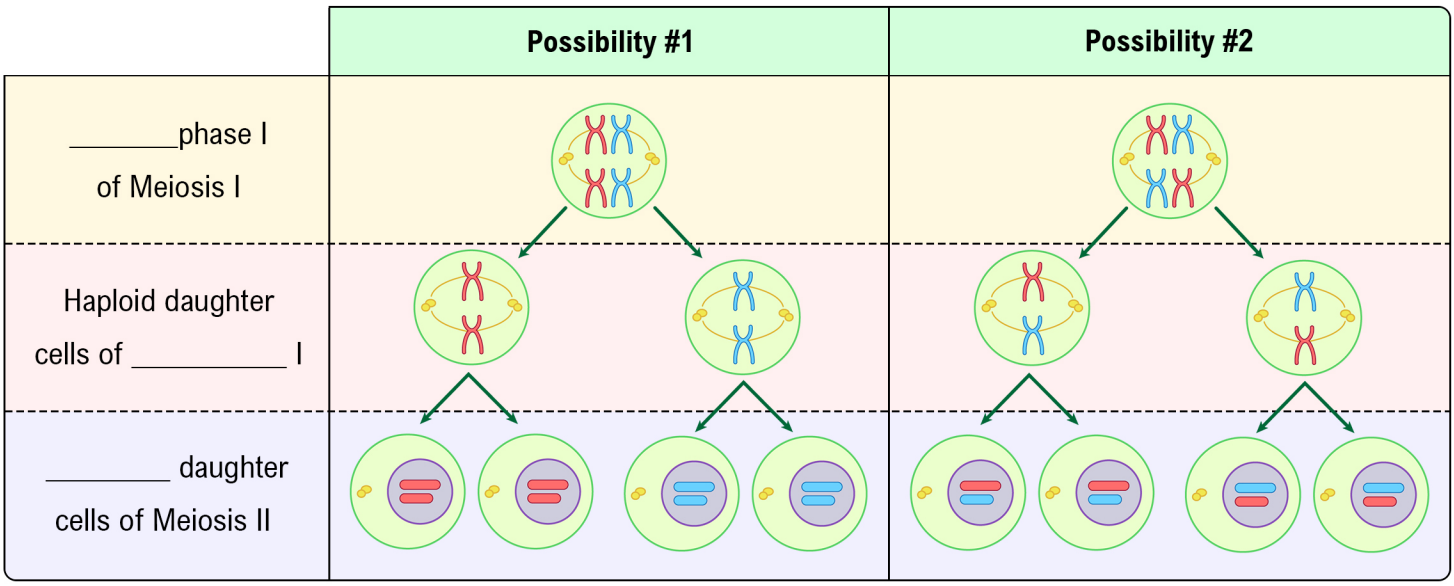
d) Metaphase II of meiosis.

TOPIC: MEIOSIS

Genetic Variation During Meiosis

- Meiosis creates genetic diversity via ____ events: 1) Crossing-Over and 2) Independent Assortment.
- **Crossing Over:** Process in which pairs of homologous chromosomes exchange _____ material.
  - Occurs during _____ I of Meiosis I.
  - **Synapsis:** _____ between homologous pairs of chromosomes.
  - **Chiasma:** _____ of crossing over.

- **Independent Assortment:** Pairs of homologous chromosomes are independently and randomly aligned.
  - Occurs during _____ I of Meiosis I.
  - Results in enormous amount of possible genetic combinations.



EXAMPLE

Crossing over involves each of the following EXCEPT:

a) The transfer of DNA between two non-sister chromatids.

b) The transfer of DNA between two sister chromatids.

c) Alignment of homologous chromosomes.

d) All of the above are involved in crossing over.

PRACTICE

During which of the following processes does independent assortment of chromosomes occur?

a) In meiosis I only.

b) In meiosis II only.

c) In mitosis and meiosis I.

d) In mitosis I and meiosis II.