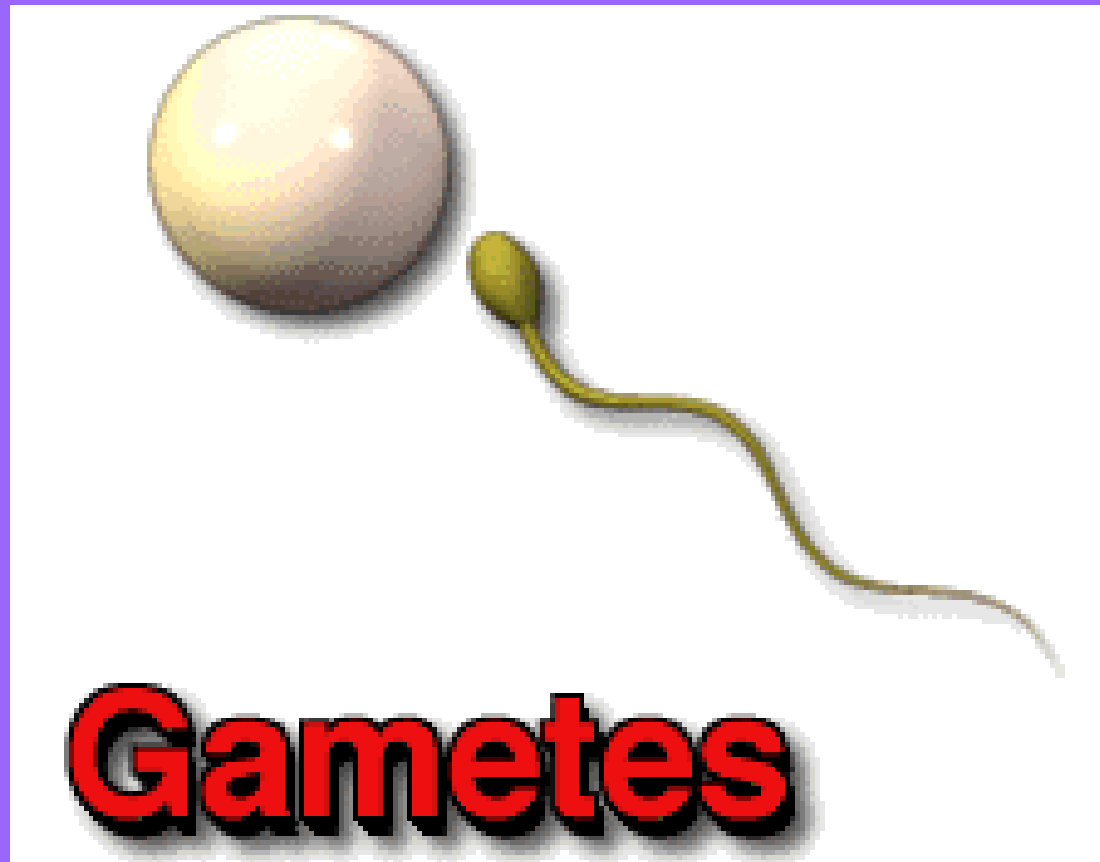
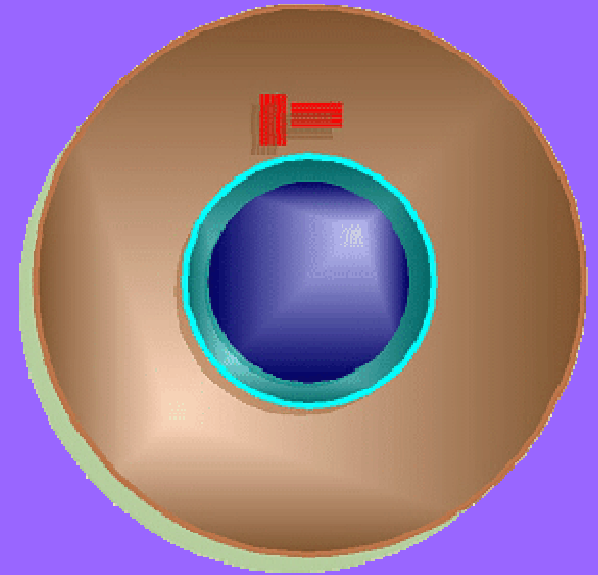


# Meiosis Notes- Part 2



# I. Meiosis

A. Process of "reduction division" in which the chromosome number is cut in half to make genetically different gamete cells.



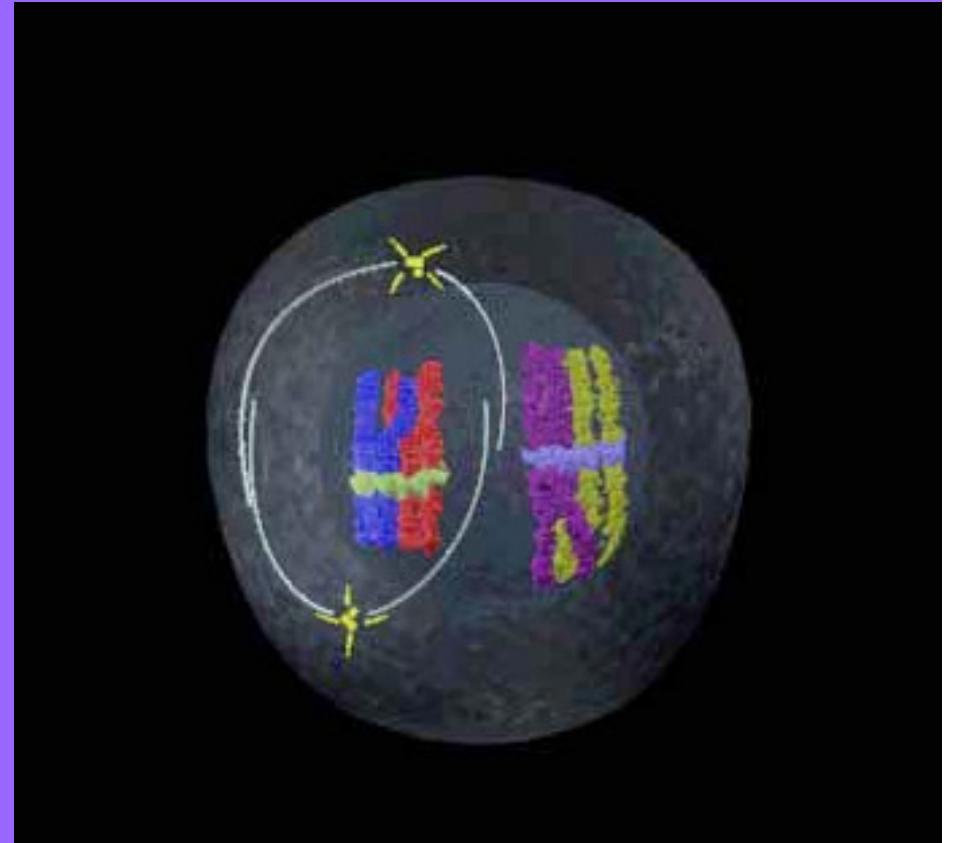
B. Two divisions- Meiosis I and Meiosis II

## II. Meiosis I

- A. starts with diploid cell from the reproductive organ (ovary or testes)
- B. PURPOSE - make cells for REPRODUCTION
- C. Prior to Meiosis I, chromosomes replicated during interphase (not a phase of meiosis).

# 1. PROPHASE I

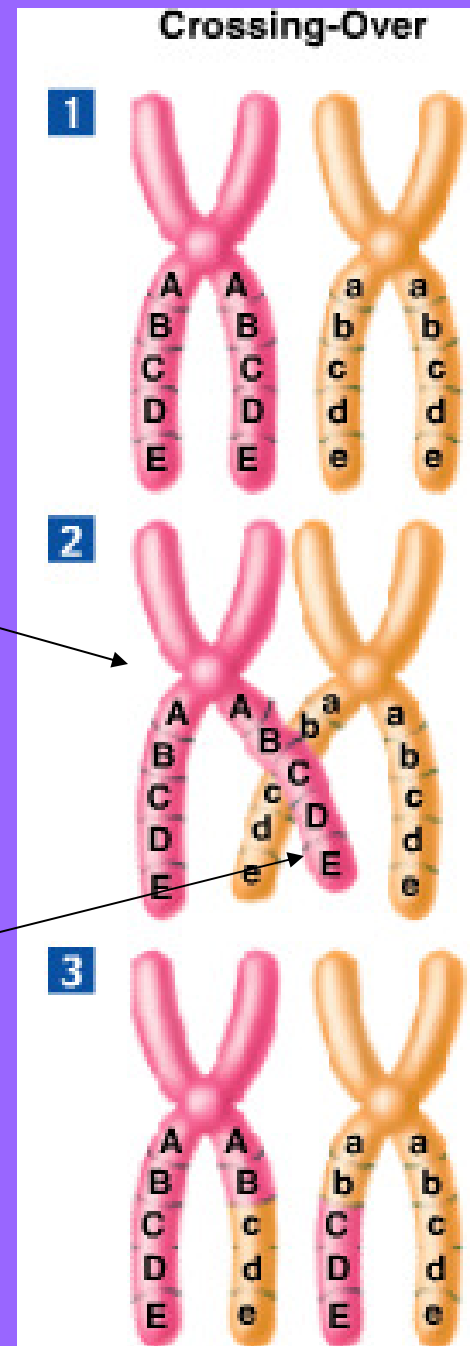
- a. Nuclear envelope disappears
- b. Nucleolus disappears
- c. Spindle fibers form
- d. Chromatin condenses to form visible chromosomes
- e. Crossing over occurs
- f. Tetrads form



i. Prophase I is almost identical to mitosis **EXCEPT:**

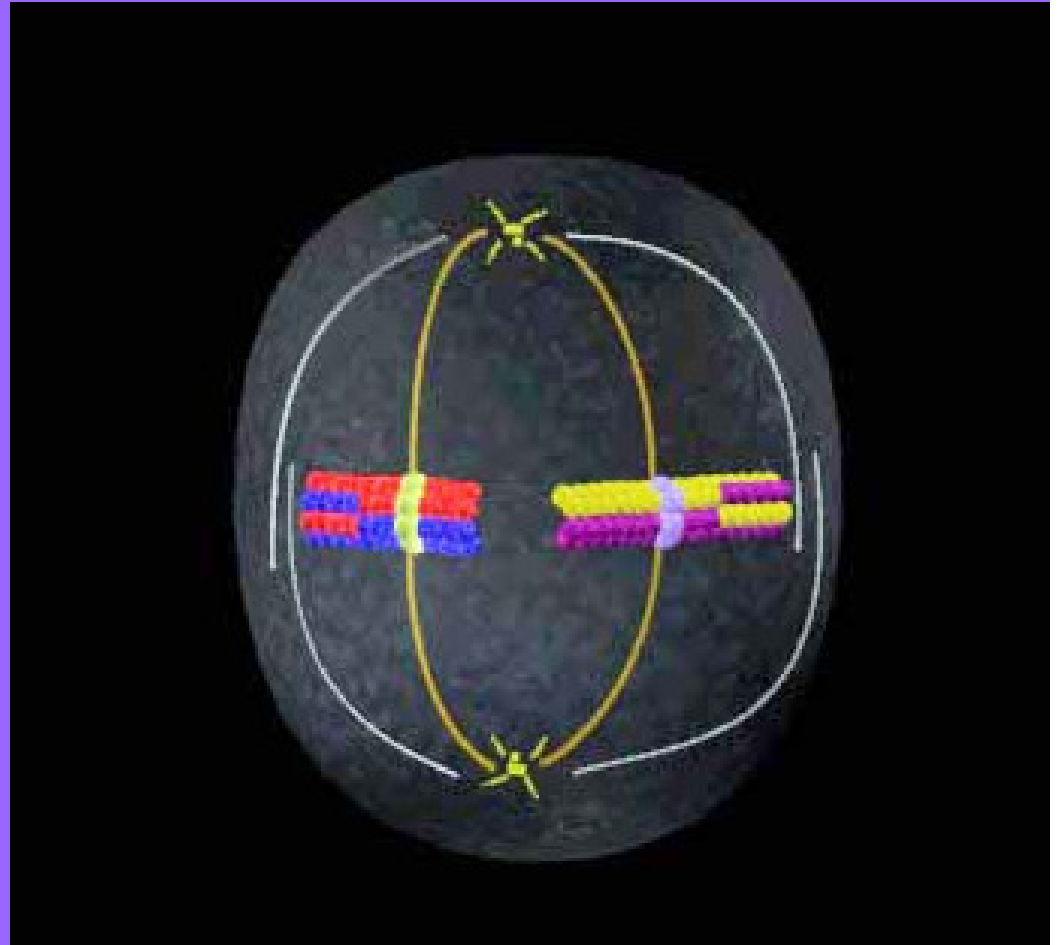
- homologous chromosomes pair up to form a **tetrad** (4 chromatids)

- **Crossing Over** -portions of genetic info is exchanged- allows for more **genetic variation** within the species.



## 2. Metaphase I-

- a. **tetrads** line up in middle of cell
- b. Spindle fibers attach to centromere of **tetrad**

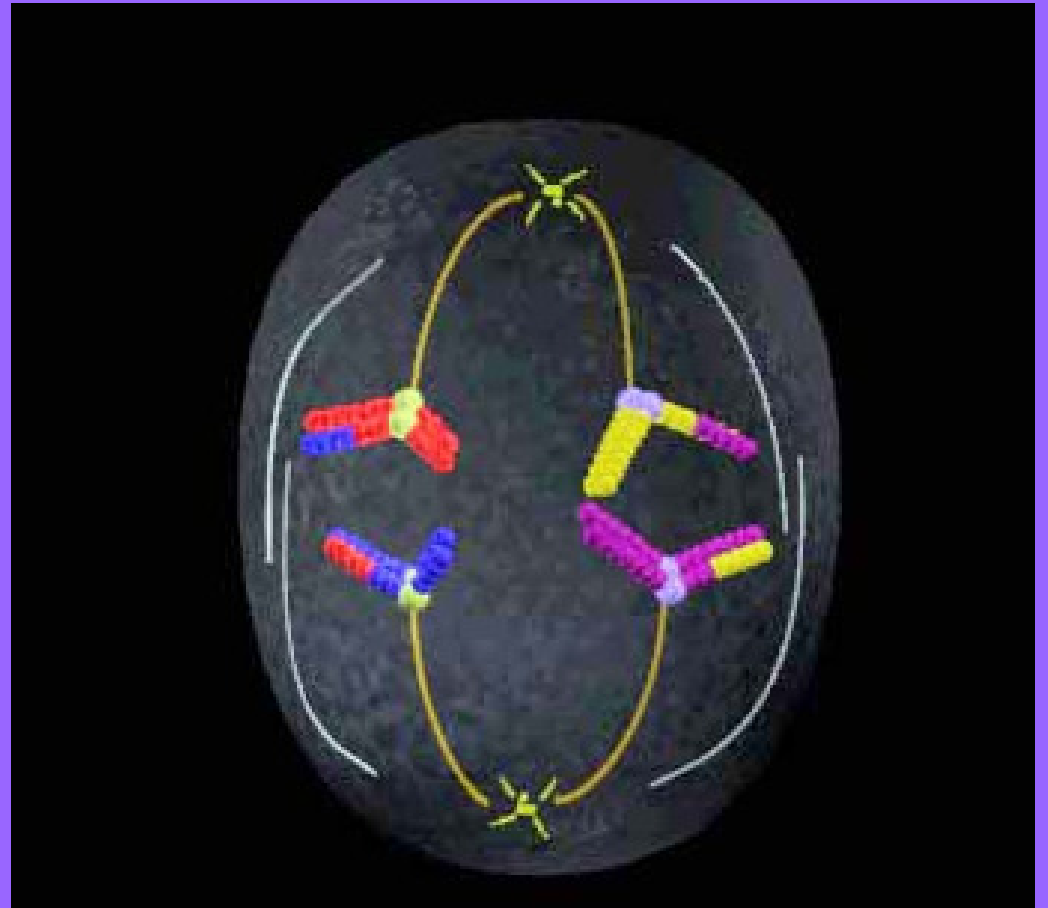


NOTICE HOW NO TWO STRANDS ARE ALIKE!!

### 3. Anaphase I -

a. **Tetrads**  
separate

b. Cytokinesis  
begins



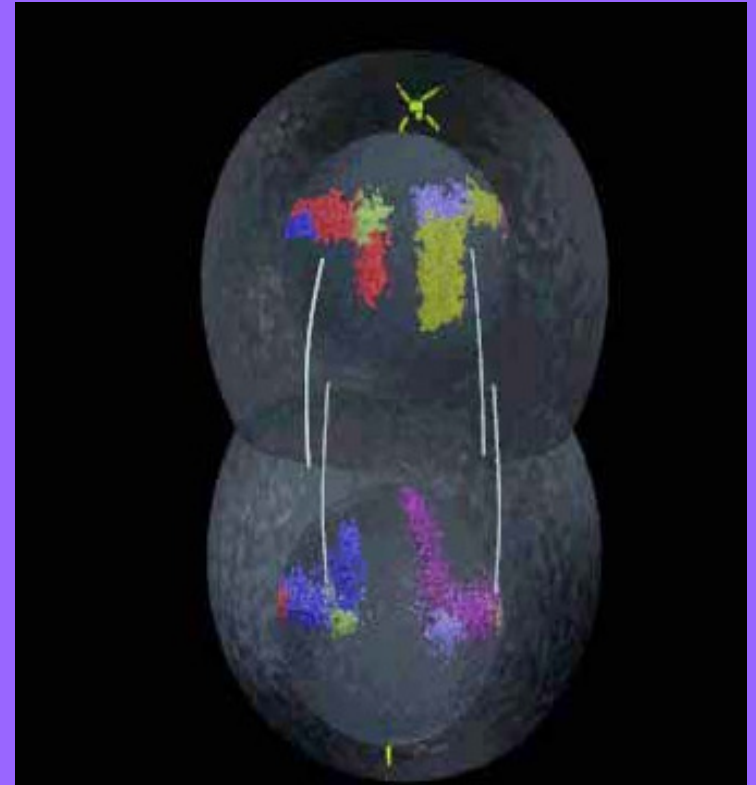
#### 4. Telophase I-

- a. Nuclear membrane reappears
- b. Nucleolus reappears
- c. Spindle fibers break down
- d. Chromosomes begin uncoiling back to chromatin

#### 5. Cytokinesis I-

- a. Cytoplasm finishes pinching in
- b. After cytokinesis finishes-  
Two cells have formed

(Both Cells are genetically different from the parent cell, and each other due to crossing over).





# 1. Meiosis I goes directly into Meiosis II

In comparison to Mitosis and meiosis I...what phase of the cell cycle is skipped?

**INTERPHASE**

What is significant about the lack of this phase?

\*hint- think about what happens in the S phase

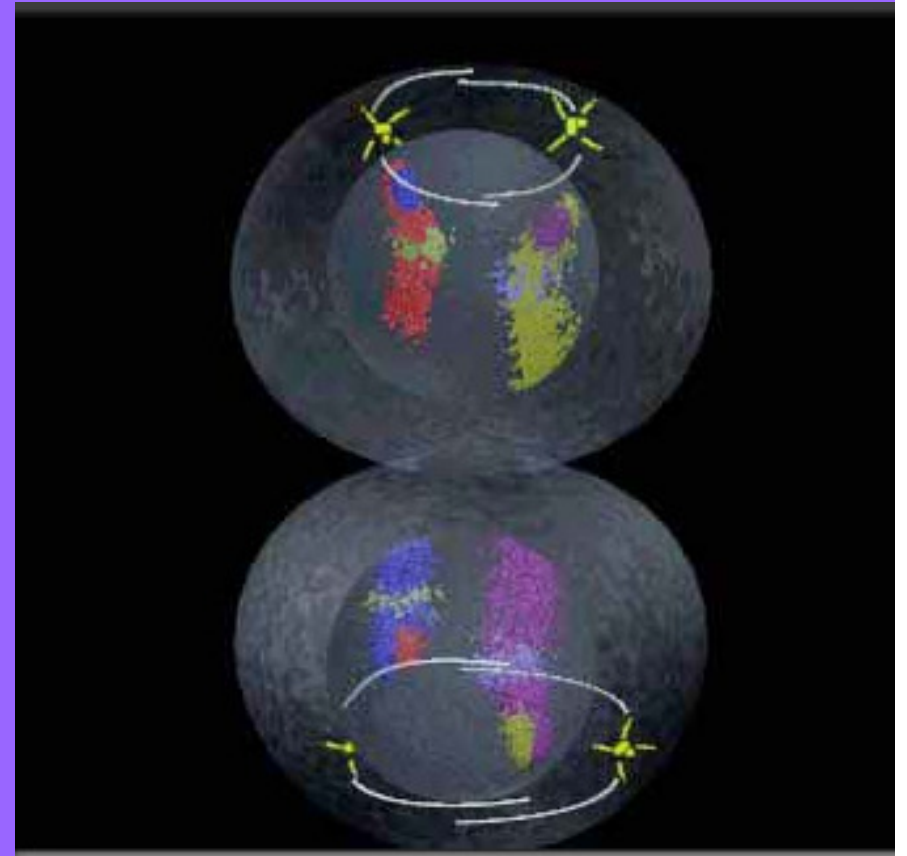
**CHROMOSOMES ARE NOT REPLICATED!**

### III. Meiosis II -No DNA Replication!

A. Both cells entering meiosis II have 2 sister chromatids (like in mitosis-except they are genetically different).

# 1. PROPHASE II

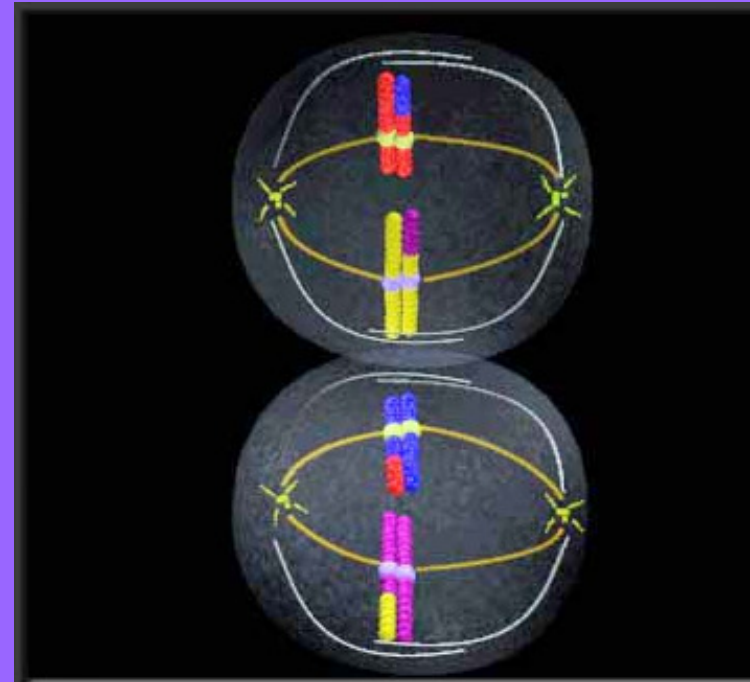
- a. Nuclear envelope disappears
- b. Nucleolus disappears
- c. Centrioles separate
- d. Spindle fibers form
- e. Chromatin condense to form visible chromosomes



## 2. METAPHASE II

a. Chromosomes line up in middle of cell

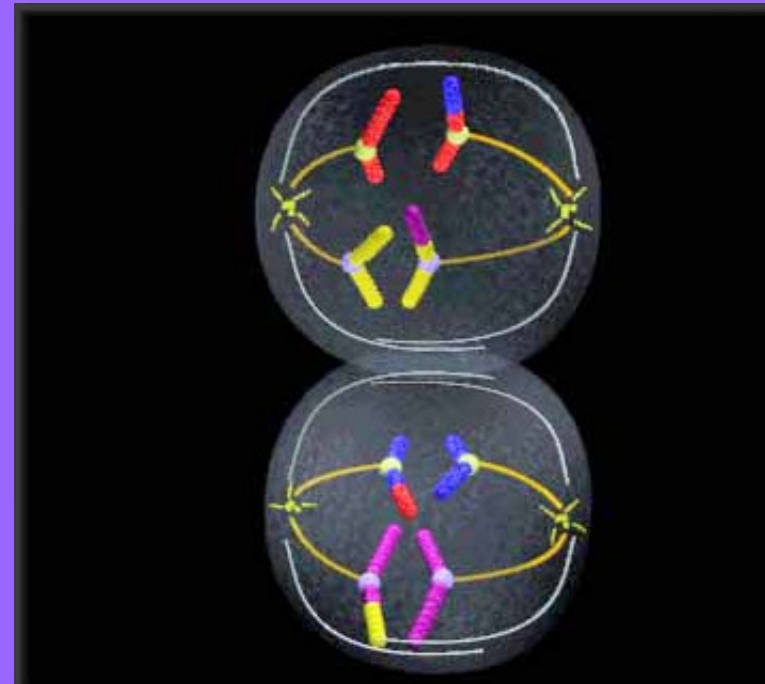
b. Spindle fibers attach to centromere of chromosomes



## 3. ANAPHASE II

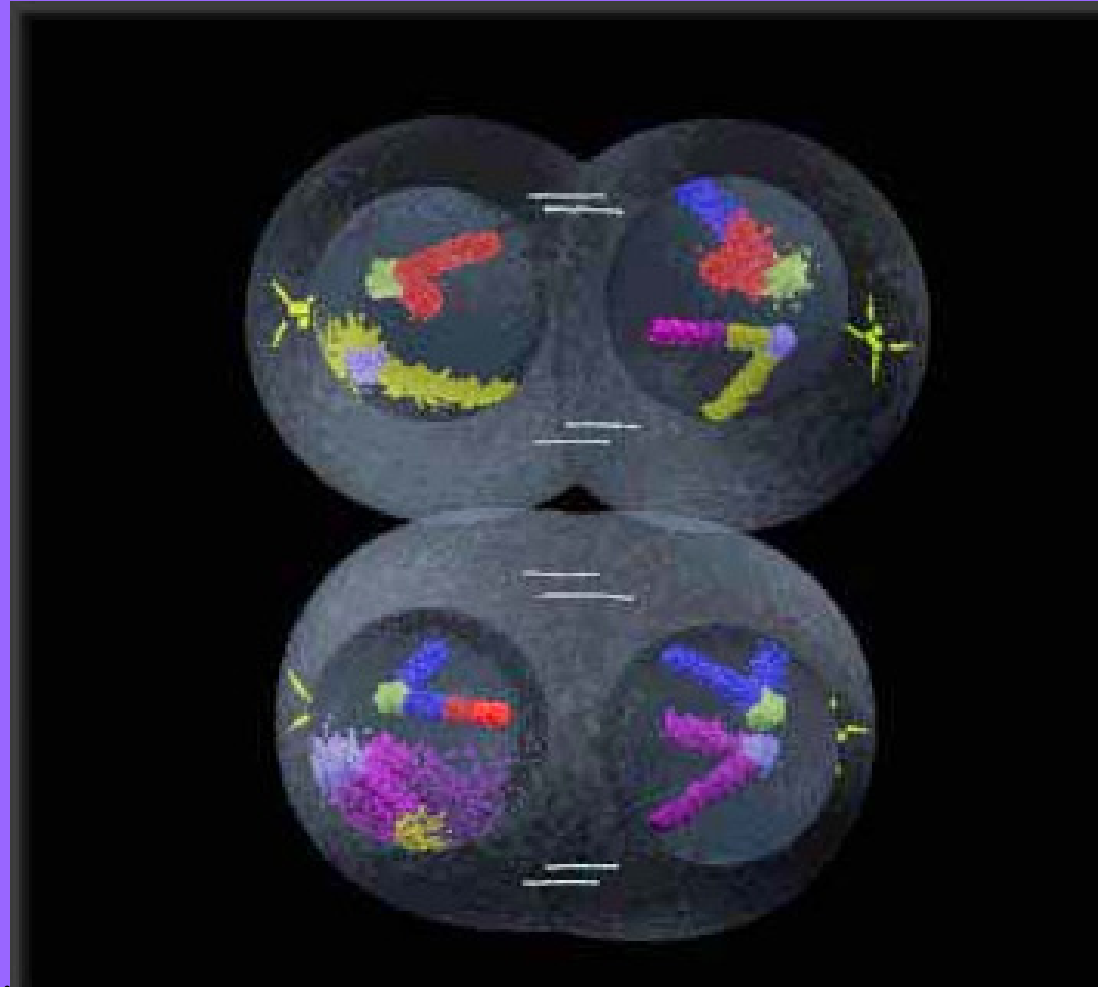
a. Chromatids separate (move apart/away) becoming individual chromosomes.

b. Cytokinesis begins



## 4. Telophase II

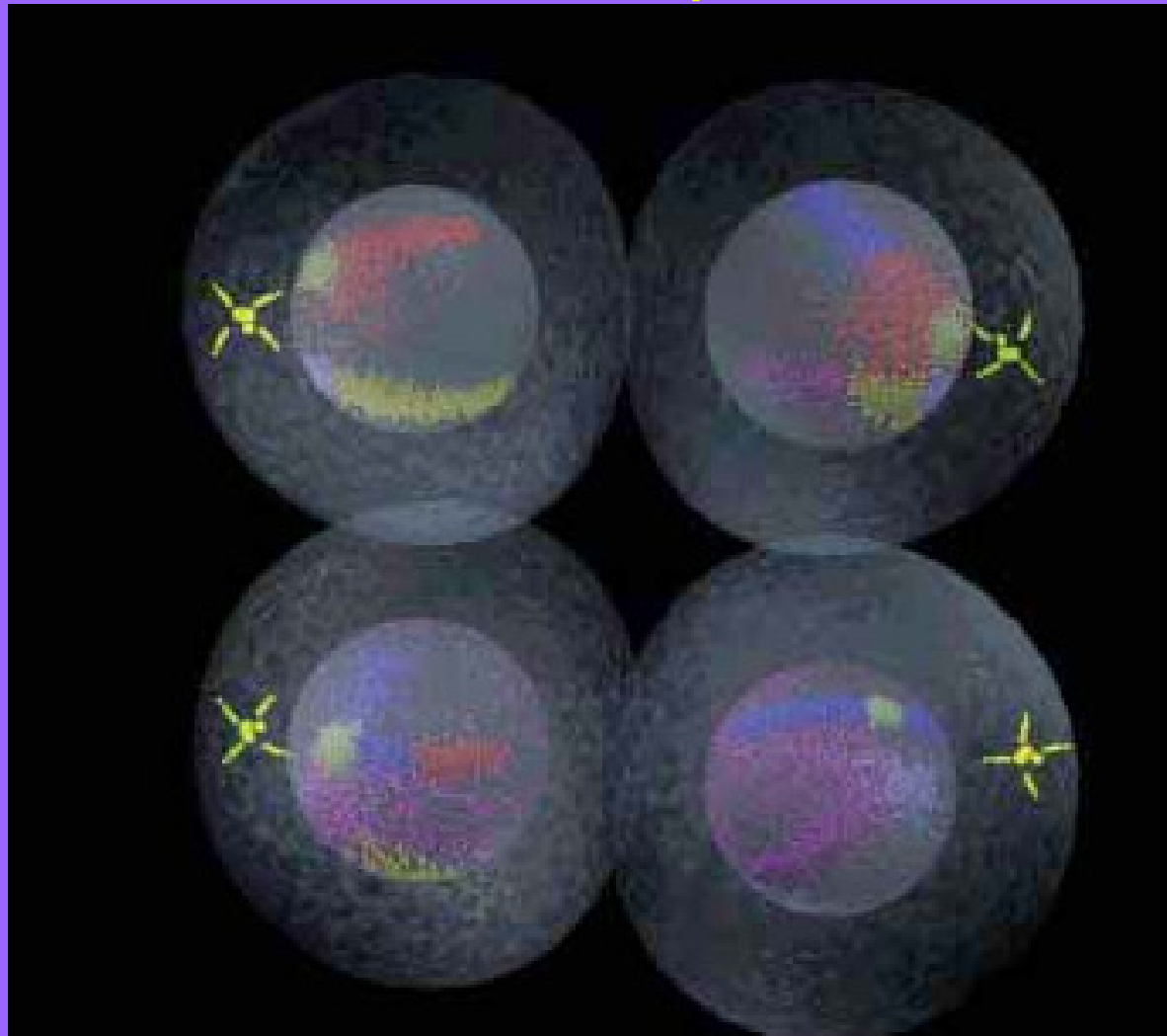
- a. Nuclear membrane reappears
- b. Nucleolus reappears
- c. Spindle fibers break down
- d. Chromosomes begin uncoiling back to chromatin



## 5. Cytokinesis II

- a. Cytoplasm finishes pinching in.
- b. After cytokinesis II finishes-Four cells have formed

f. End result: 4 genetically different gametes with the haploid (N) number of chromosomes, for reproduction!

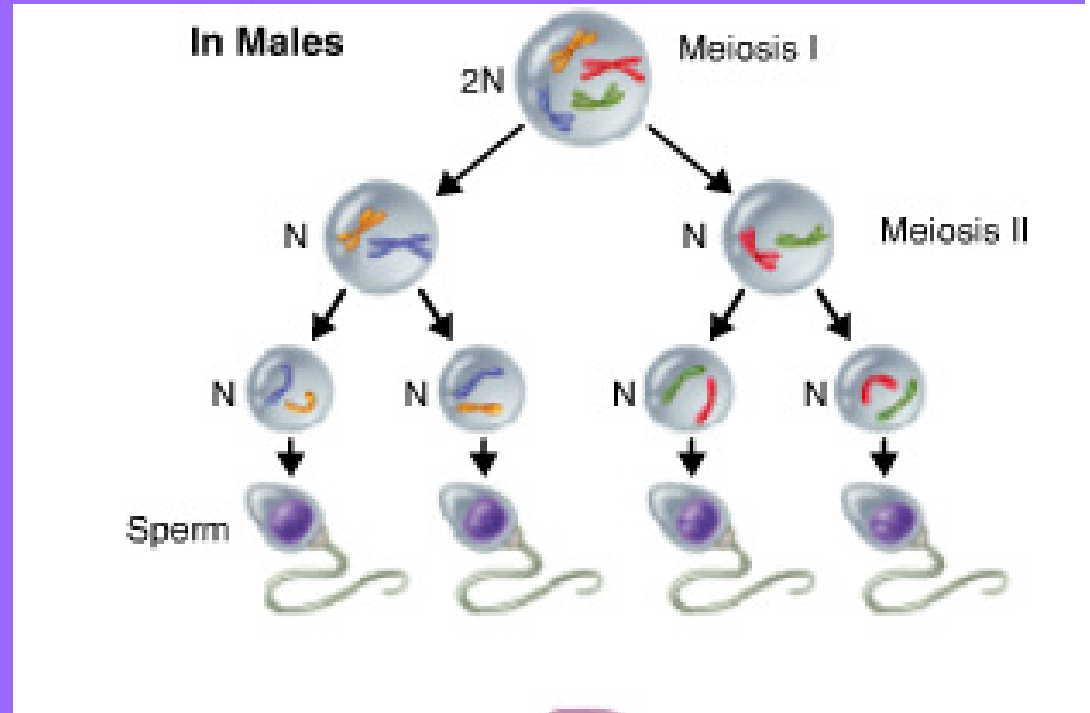


# IV. Male Gamete Formation

A. Four haploid gamete cells formed

B. Humans

1. Takes place in testes
2. Begins at puberty
3. Continues for lifetime



# V. Female Gamete formation

## A. Four haploid, gamete cells formed

1. One "useable egg" -receives most of the cytoplasm(nutrients)
2. Three Polar bodies (cells that didn't get enough nutrients to become an egg.

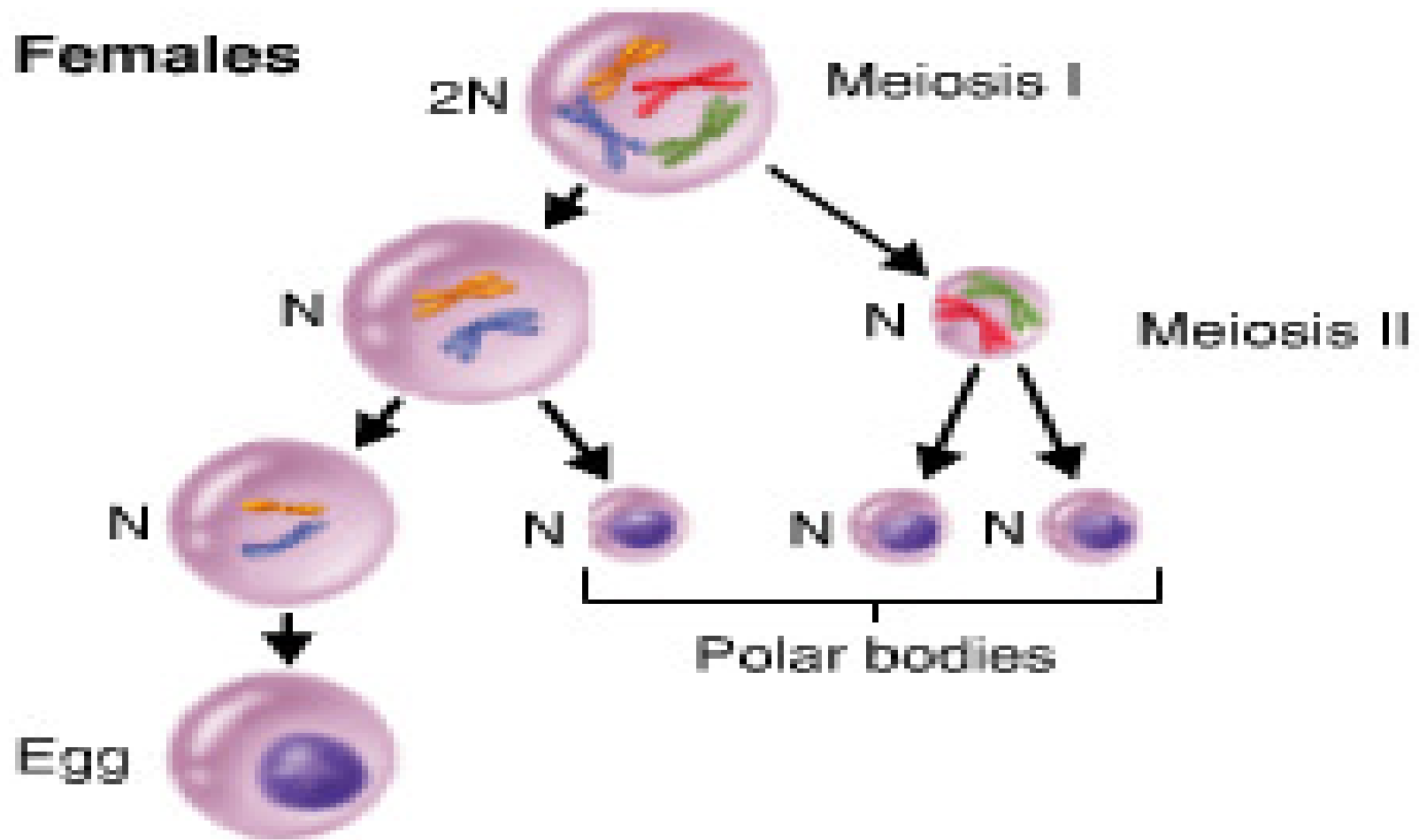
## B. HUMANS

1. Takes place in ovaries before baby girl is born
2. Pauses then continues at puberty with menstrual cycle until menopause



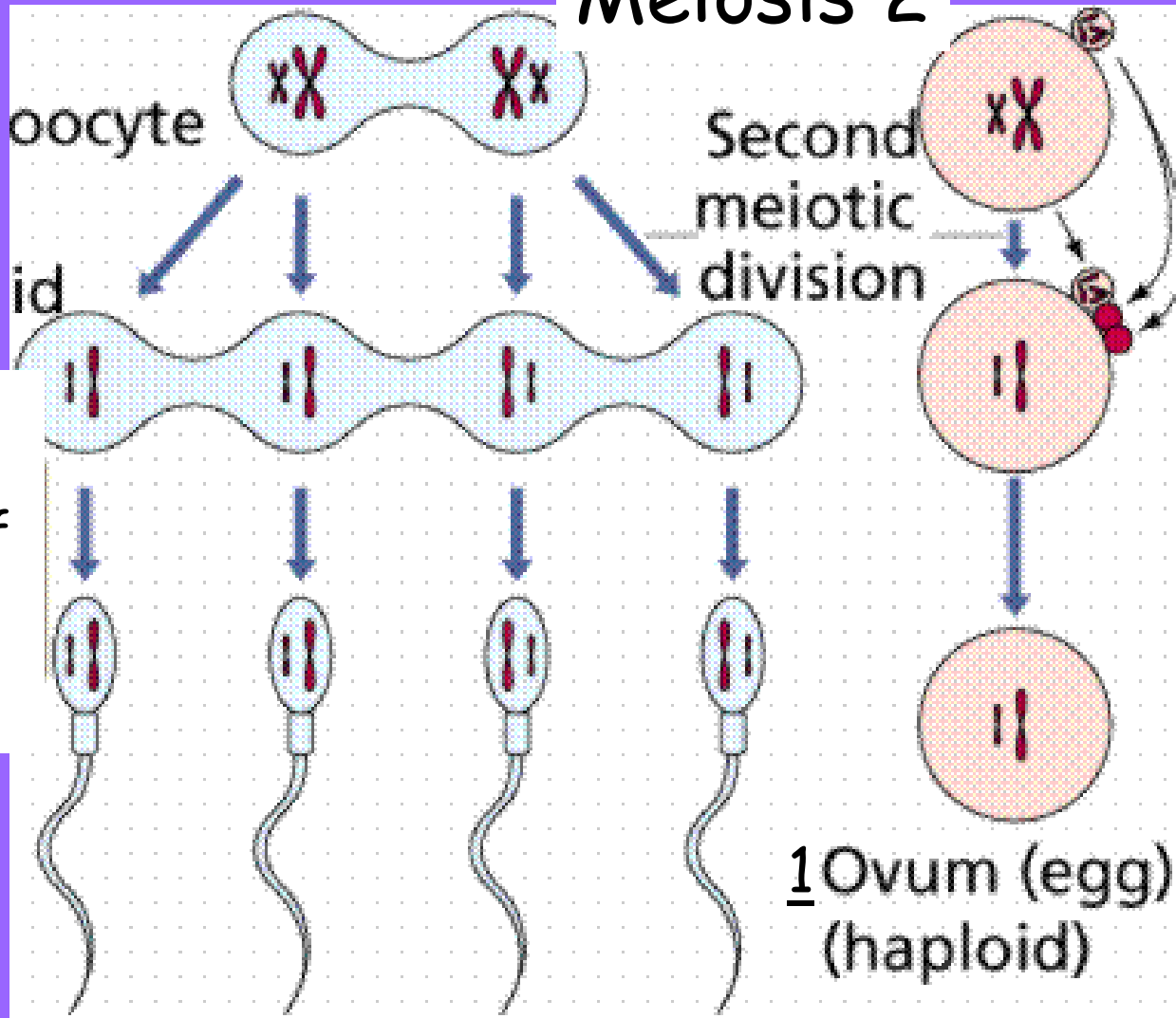
# FEMALE GAMETE FORMATION

**In Females**



# Start of Meiosis 2

One cell gets Most of cytoplasm (nutrients)

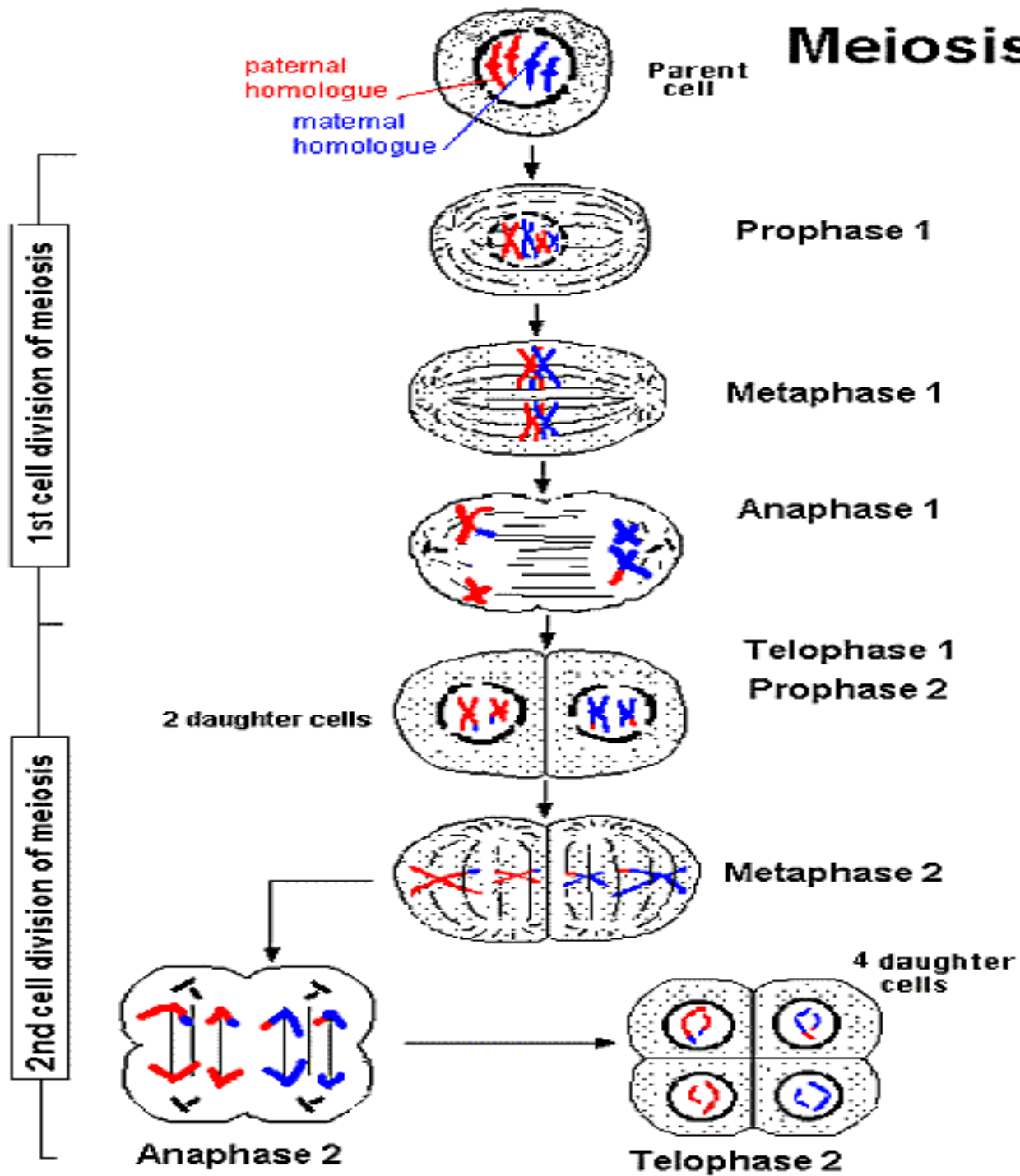


3 Polar Bodies form

1 Ovum (egg) (haploid)

All 4 cells Get equal Amounts of Cytoplasm 4 sperm Cells form.

# Meiosis



# Mitosis vs. Meiosis

FEATURE	MITOSIS	MEIOSIS
Type of Cell	somatic	Gamete
Number of Cells produced	2	4
End Product	Two identical body cells	4 genetically different gametes
Number of chromosomes	Same as original cell (Diploid)	Half of original cell (Haploid)

