

# Mitosis & Meiosis

Mitosis animation:

[http://www.youtube.com/watch?v=2WwIKdyBN\\_s&feature=related](http://www.youtube.com/watch?v=2WwIKdyBN_s&feature=related)

# Mitosis:

- If a cell wants to make a duplicate of itself, it first must copy its DNA (part of a chromosome).
- The copies then must be separated & sorted into two sides of the cell.
- The cell then splits in two. Part of each parent is carried to the two new cells.
- Results in cells such as internal organs, skin, bones, blood, etc.

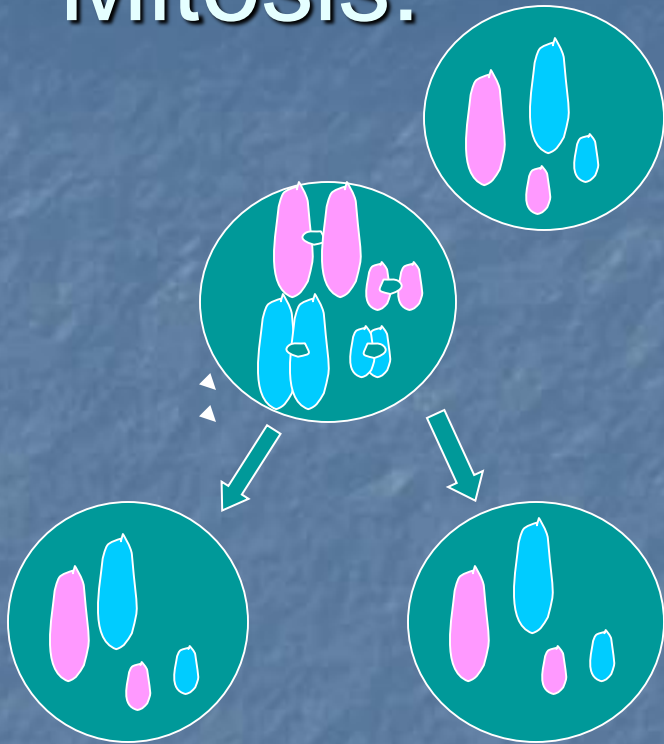
# Meiosis:

- As in mitosis, if a cell wants to make a duplicate of itself, it first must copy its DNA (part of a chromosome).
- Results in reproductive cells (sperm, eggs, etc).
- Part of each parent is carried to the four new cells.

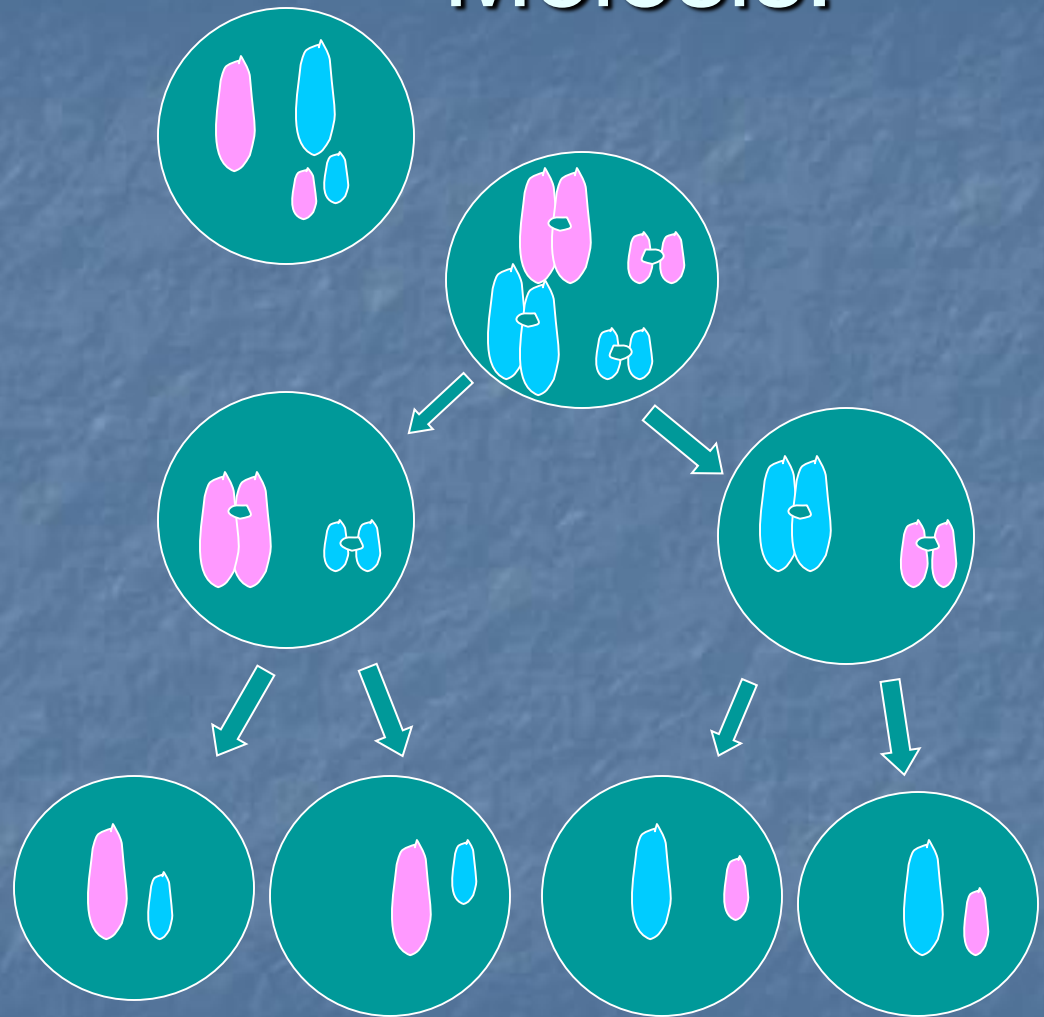
This may you remember these terms:

- **MIT**osis takes the cell and **M**akes **I**t **T**wo (diploid)
- **M**eiosis has to do with **s**ex
- From the cell's point of view:
  - **m**ITosis results in **I**dentical **T**wins
  - **m**Eio**S**is results in **E**gg and **S**perm (haploid)

# Mitosis:



# Meiosis:



Each resulting cell still has chromosomes from mom & dad

# Mitosis

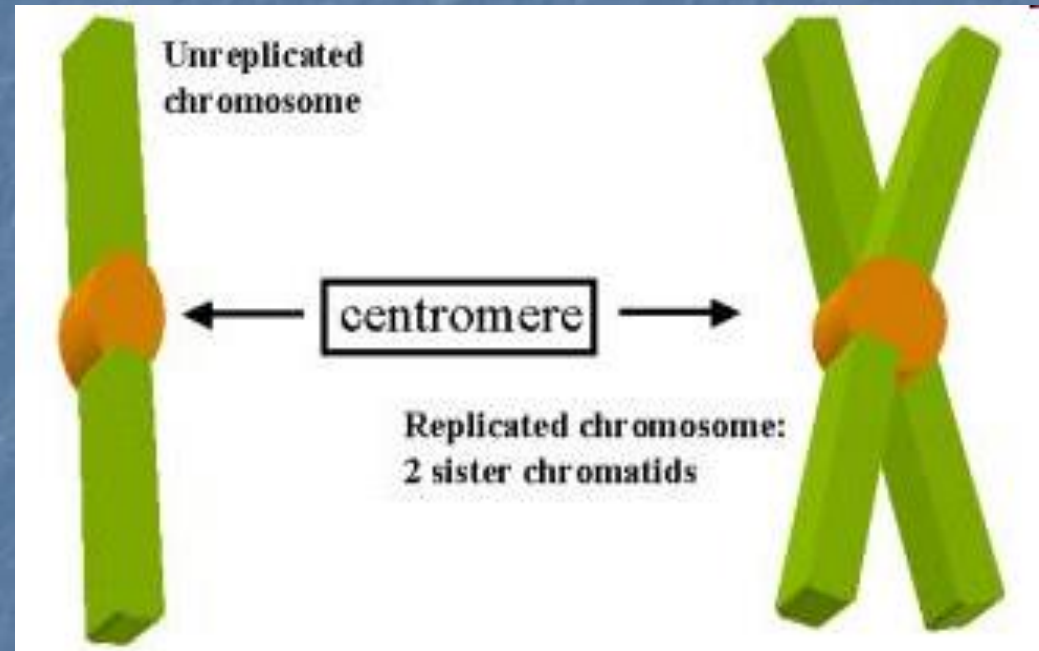
- Mitosis animations:
  - [http://www.youtube.com/watch?v=2WwIKdyBN\\_s&feature=related](http://www.youtube.com/watch?v=2WwIKdyBN_s&feature=related)
  - <http://www.youtube.com/watch?v=VIN7K1-9QB0>

# Vocabulary

- Diploid
- Haploid
- Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase
- Cytokinesis

# Interphase occurs just before Mitosis begins:

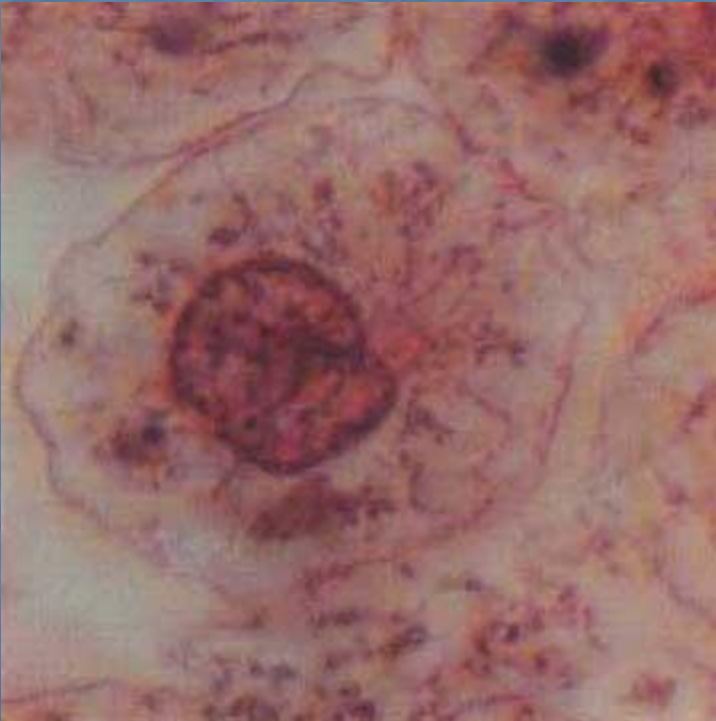
DNA is replicated along with organelles and other cellular components and the cell prepares for division.



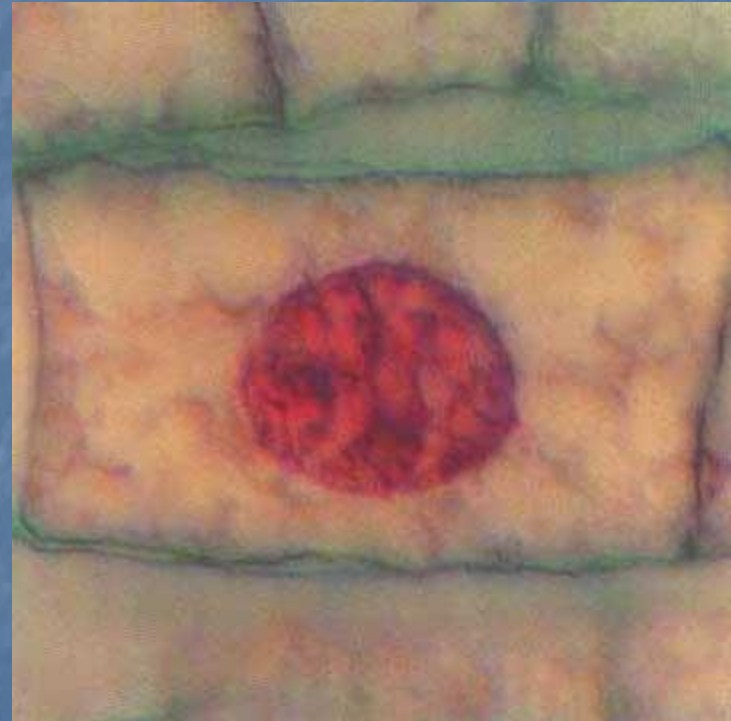


# Mitosis Interphase

Animal cell



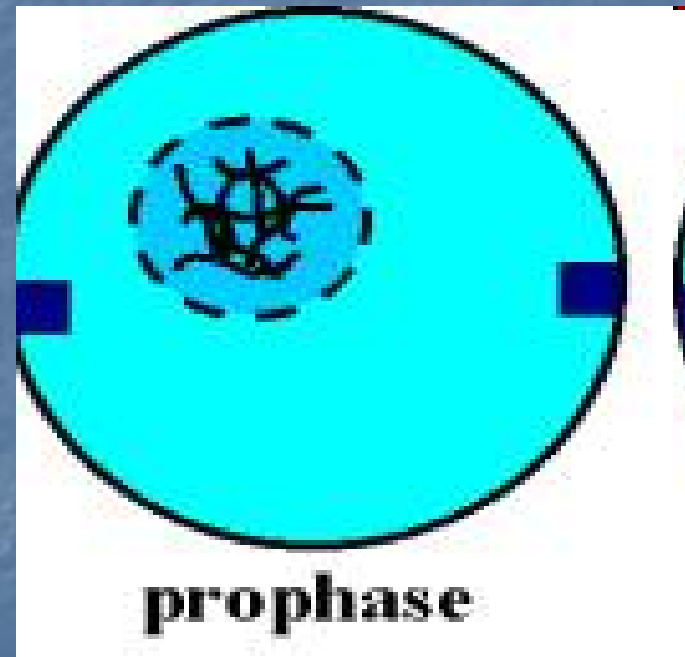
Plant cell



# 1<sup>st</sup> step in Mitosis:

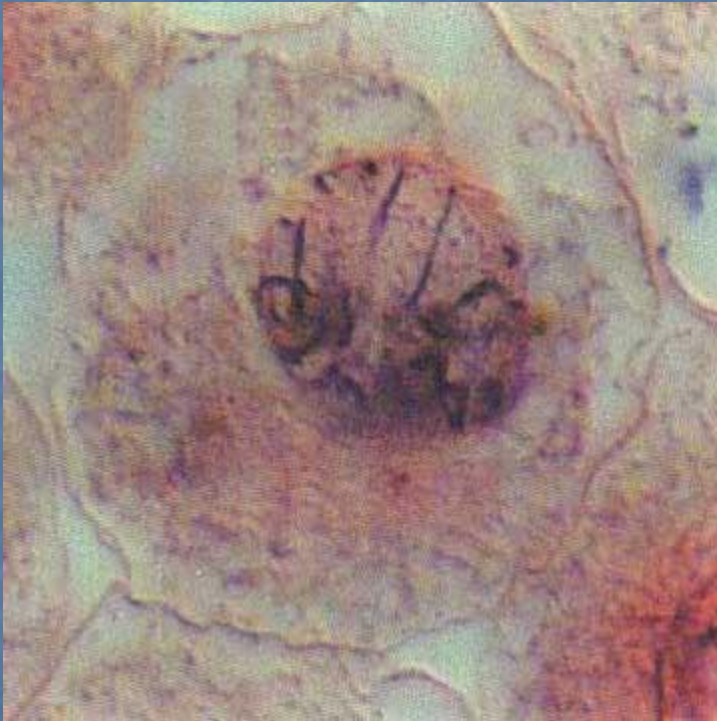
## Prophase (preparation phase)

The DNA recoils, and the chromosomes condense; the nuclear membrane disappears, and the mitotic spindles begin to form.

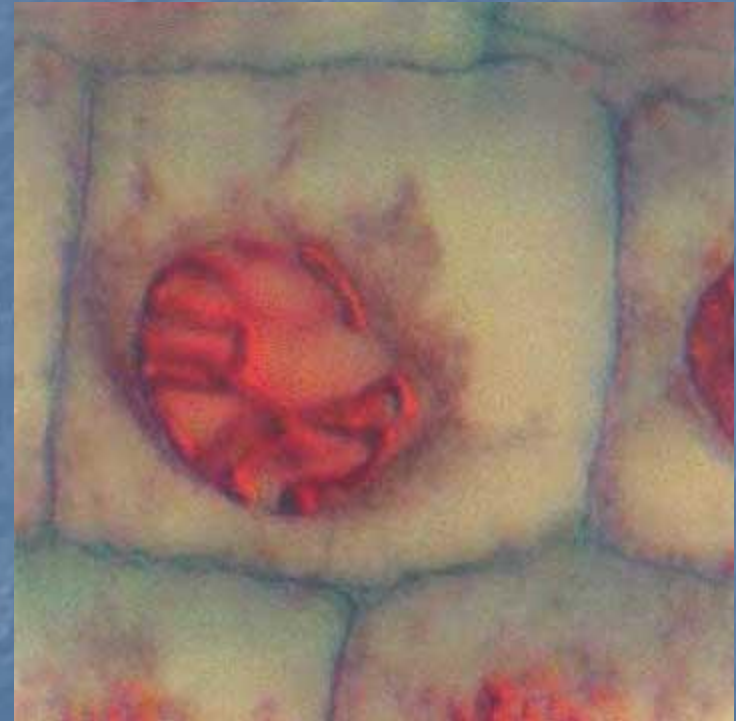


# Mitosis Prophase

Animal cell

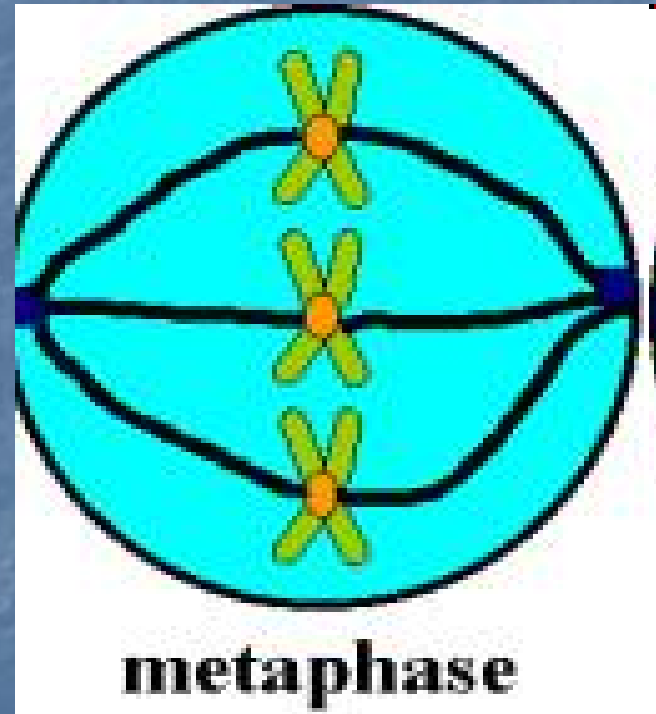


Plant cell



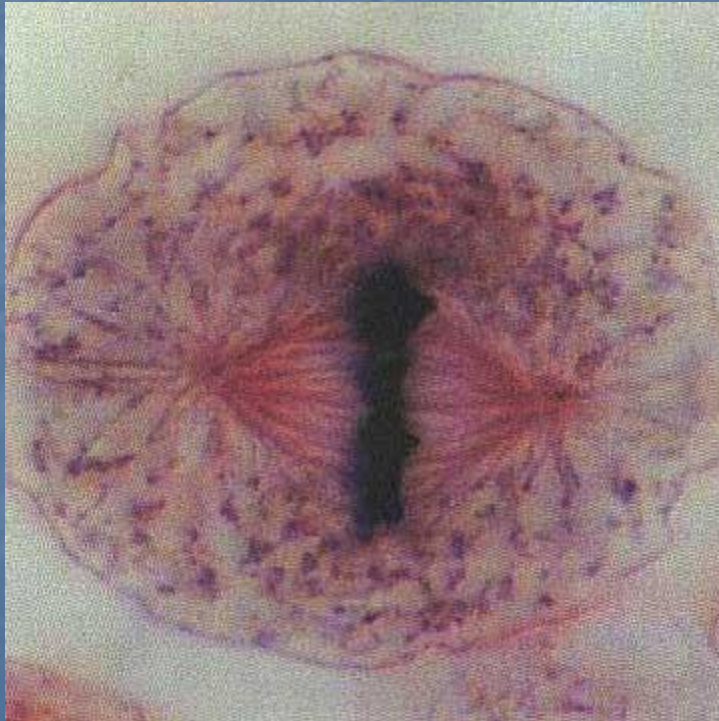
# 2<sup>nd</sup> step in Mitosis: metaphase (organizational phase)

The chromosomes line up the middle of the cell with the help of spindle fibers attached to the centromere of each replicated chromosome.

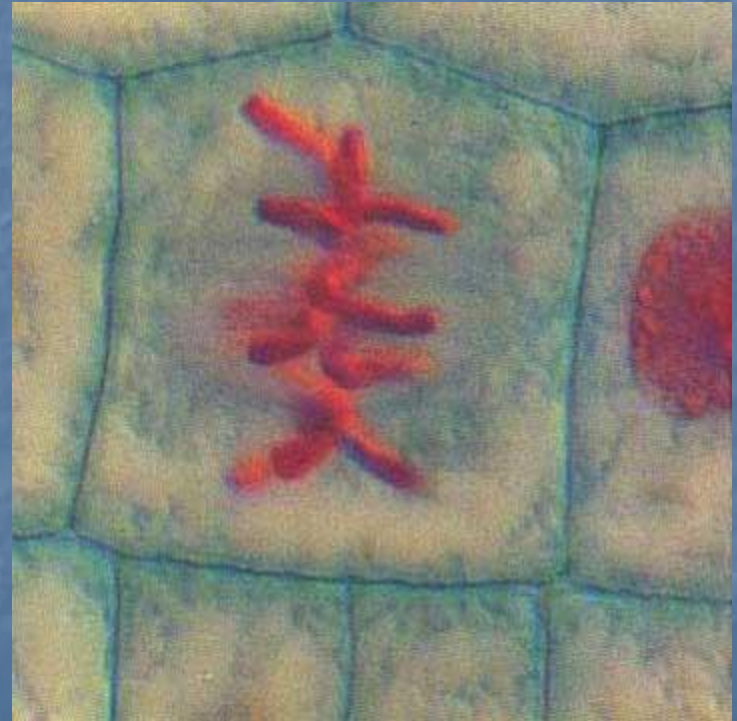


# Mitosis **Metaphase**

Animal cell

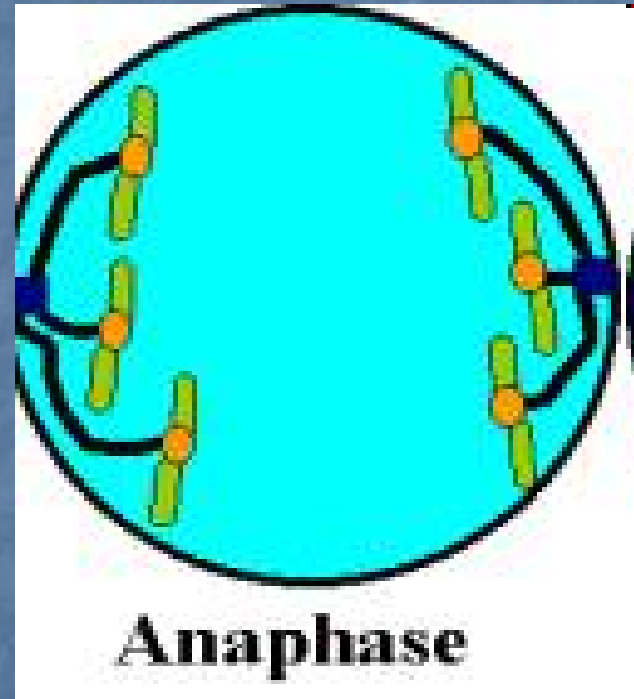


Plant cell



# 3<sup>rd</sup> step in Mitosis: Anaphase (separation phase)

The chromosomes split in the middle and the sister chromatids are pulled by the spindle fibers to opposite poles of the cell.

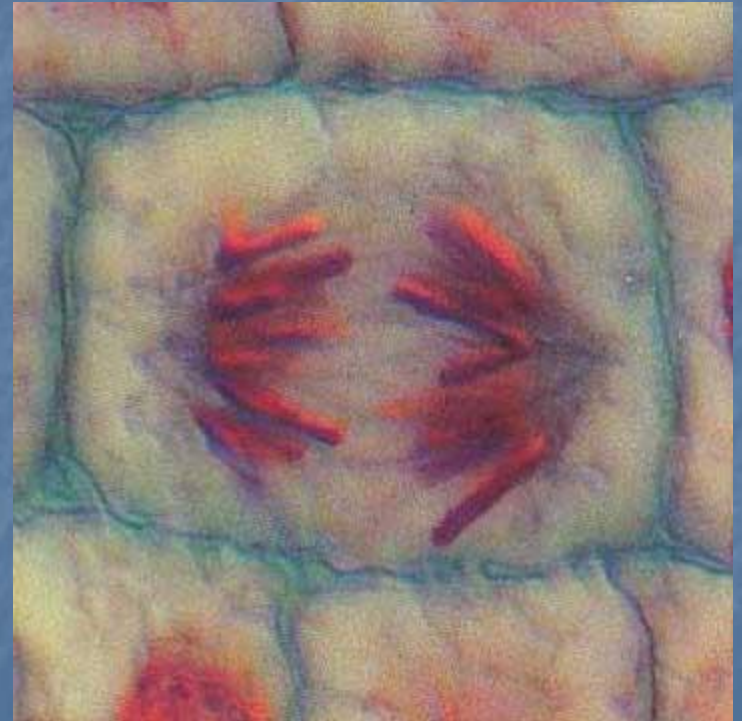


# Mitosis **Anaphase**

Animal cell

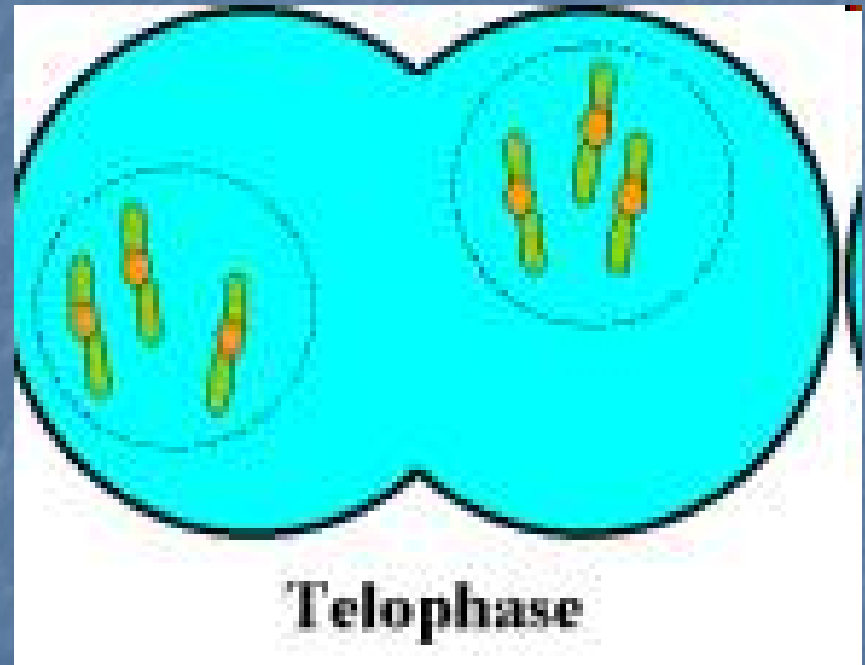


Plant cell



# 4<sup>th</sup> step in Mitosis: Telophase

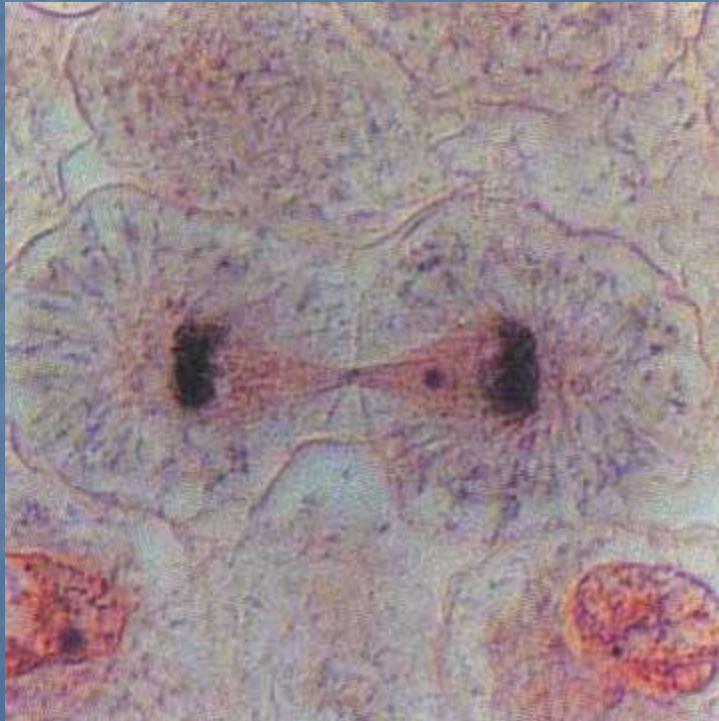
The chromosomes, along with the cytoplasm and its organelles and membranes are divided into 2 portions. This diagram shows the end of telophase.



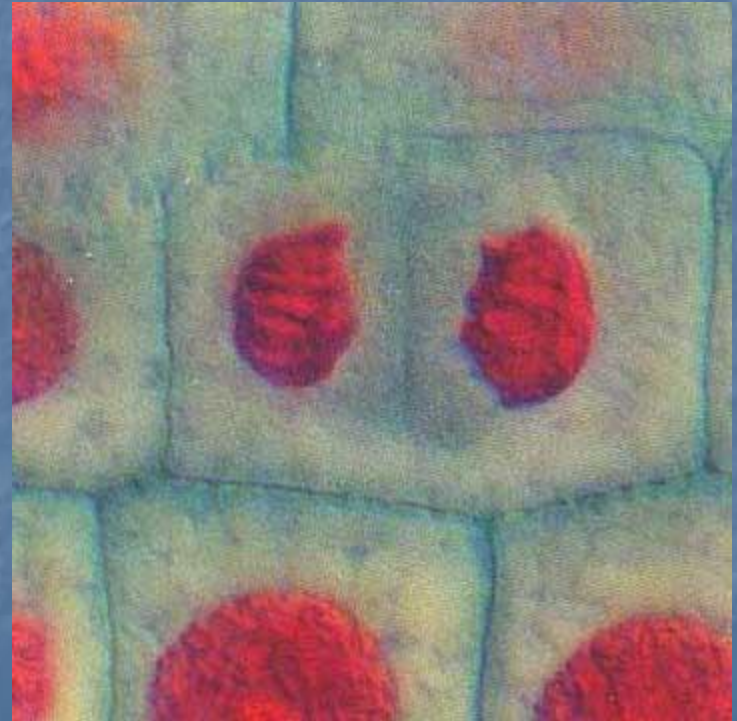


# Mitosis **Telophase**

Animal cell



Plant cell

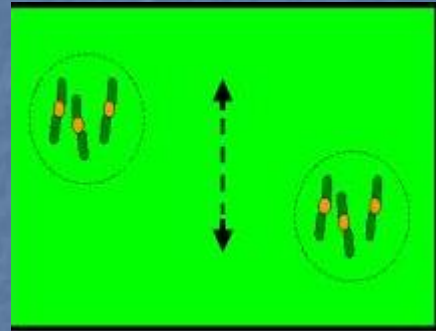


# After Mitosis: Cytokinesis

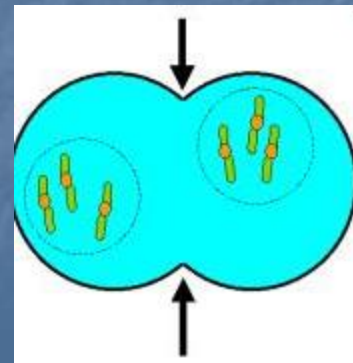
The actual splitting of the daughter cells into

two separate cells is called cytokinesis and occurs differently in both plant and animal Cells.

Beginning of cytokinesis in a plant:



Beginning of cytokinesis in an animal:



# Meiosis

- Meiosis animation:

[http://www.youtube.com/watch?v=D1\\_-mQS\\_FZ0&NR=1](http://www.youtube.com/watch?v=D1_-mQS_FZ0&NR=1)

# Vocabulary

- Diploid
- Haploid
- Germ cell
- Somatic cell
- Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase
- Cytokinesis

# MEIOSIS

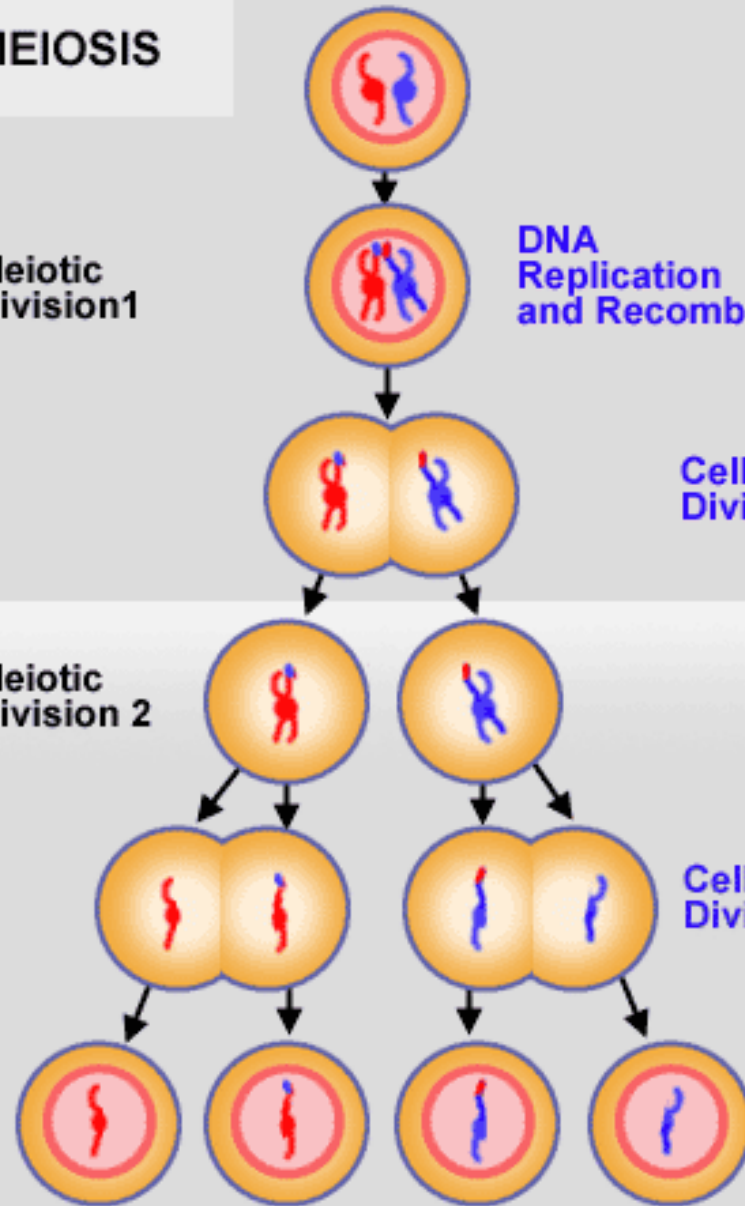
Meiotic  
Division 1

DNA  
Replication  
and  
Recombination

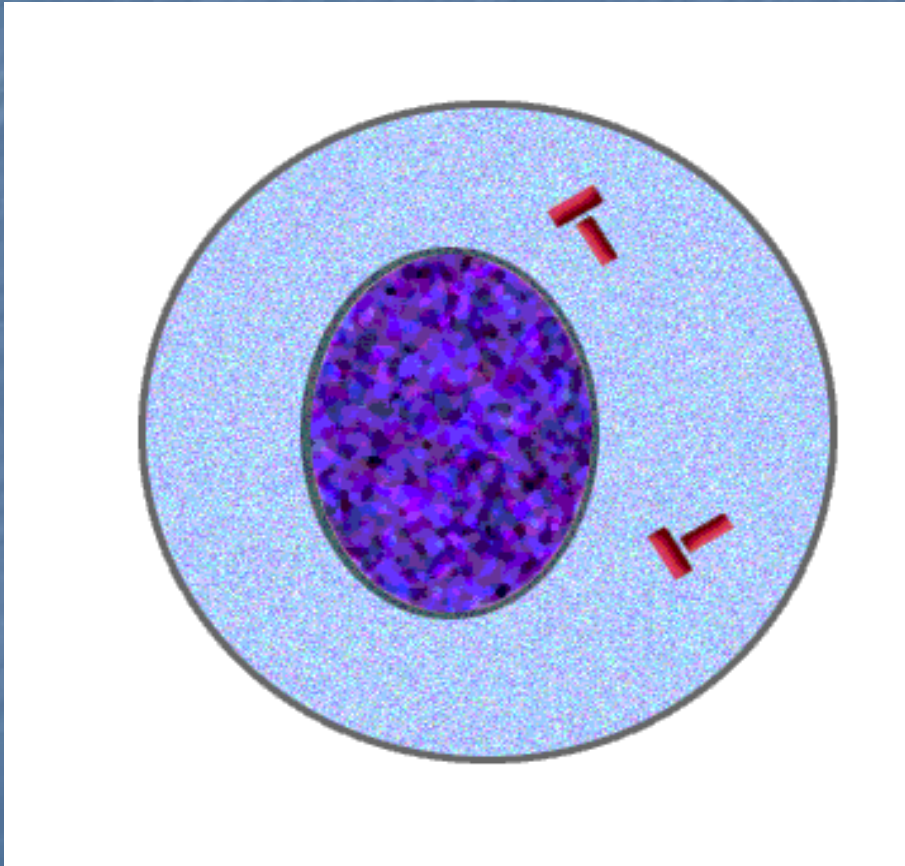
Cell  
Division 1

Meiotic  
Division 2

Cell  
Division 2

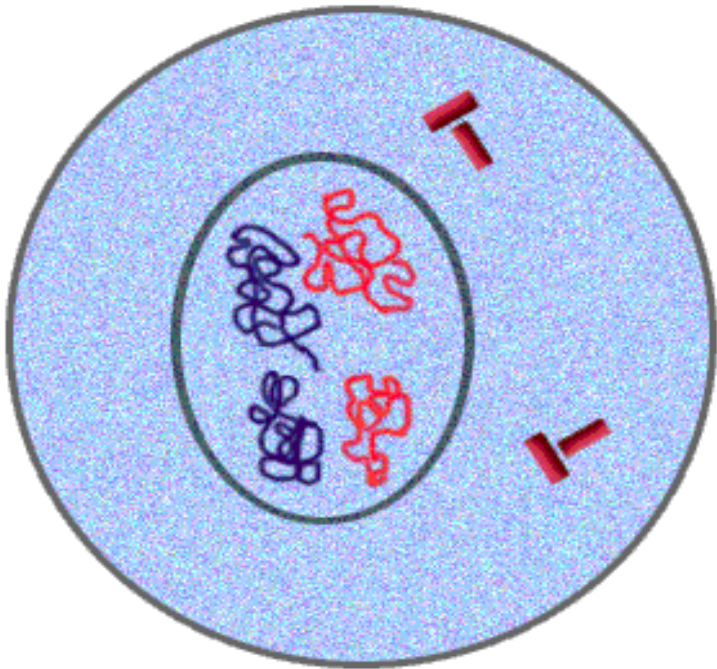


# Meiosis **Interphase**



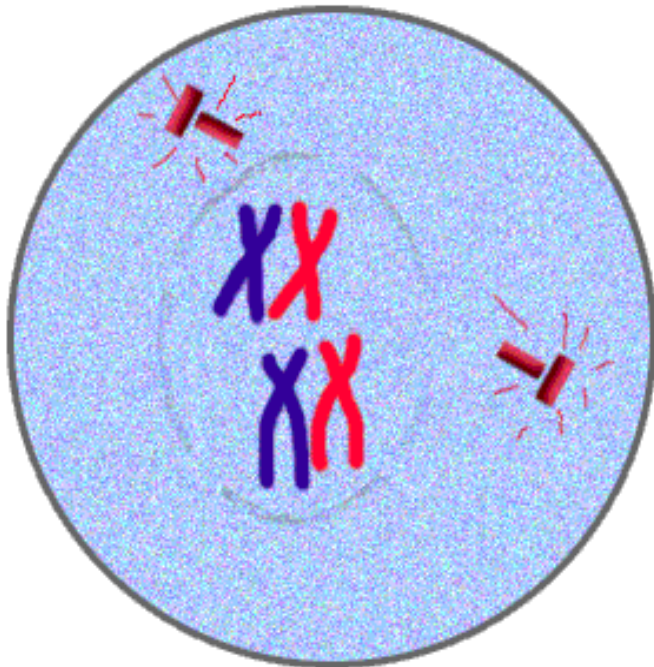
Meiosis is preceded by interphase. The chromosomes have not yet condensed.

# Meiosis **Interphase**



The chromosomes have replicated, and the chromatin begins to condense.

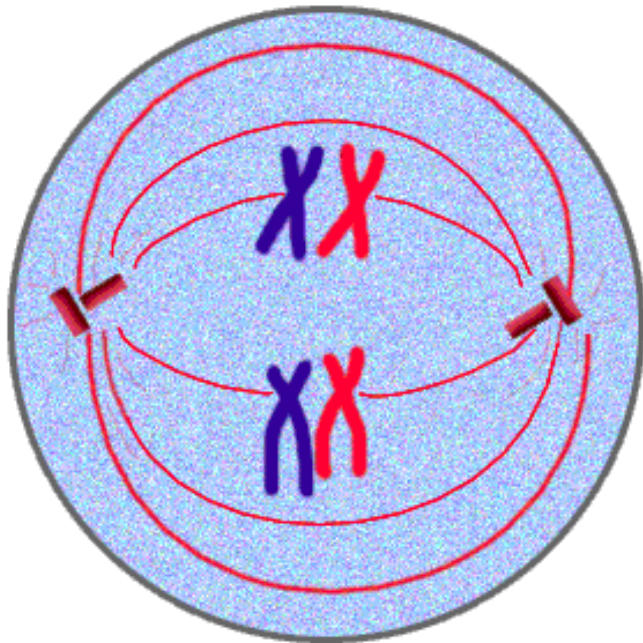
# Meiosis Prophase I



The chromosomes are completely condensed. In meiosis (unlike mitosis), the homologous chromosomes pair with one another

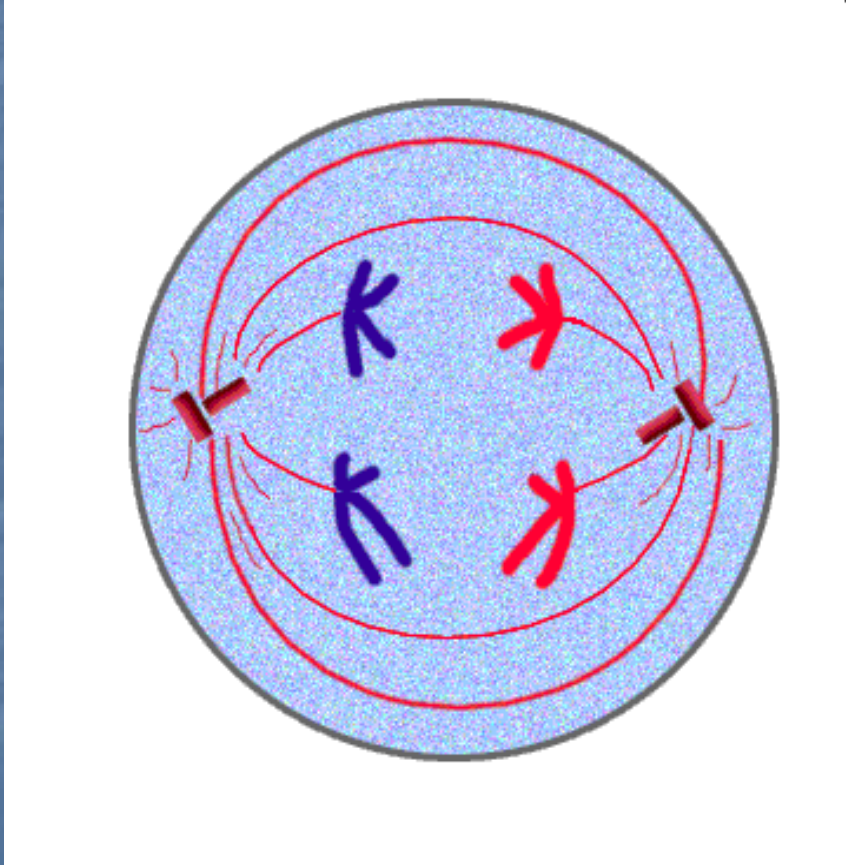


# Meiosis **Metaphase I**



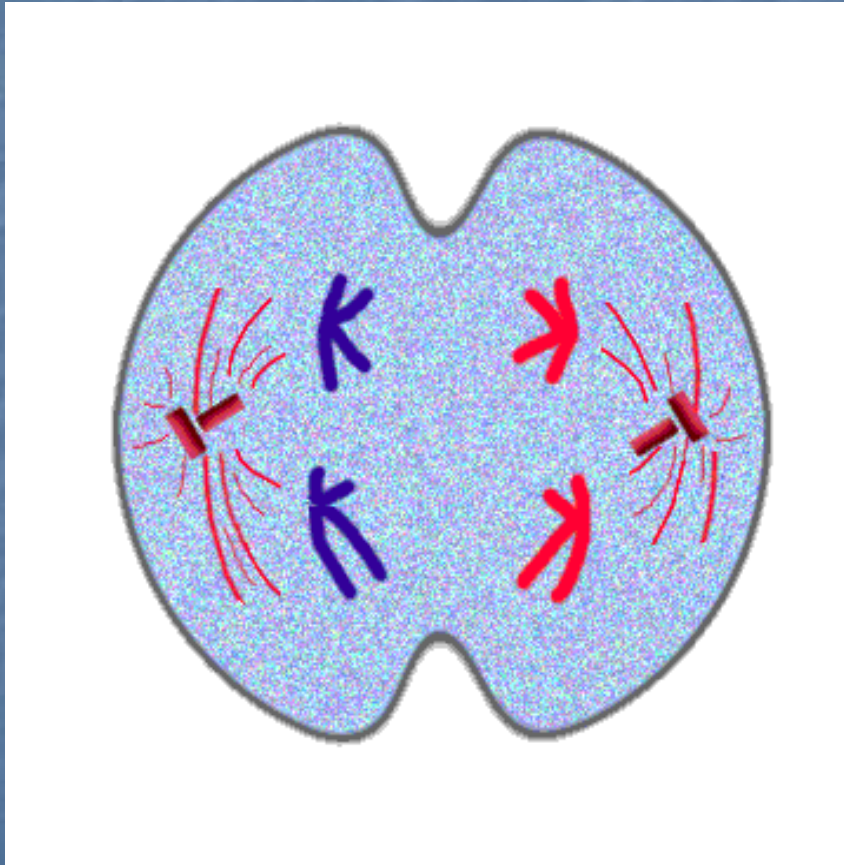
The nuclear membrane dissolves and the homologous chromosomes attach to the spindle fibers. They are preparing to go to opposite poles.

# Meiosis **Anaphase I**



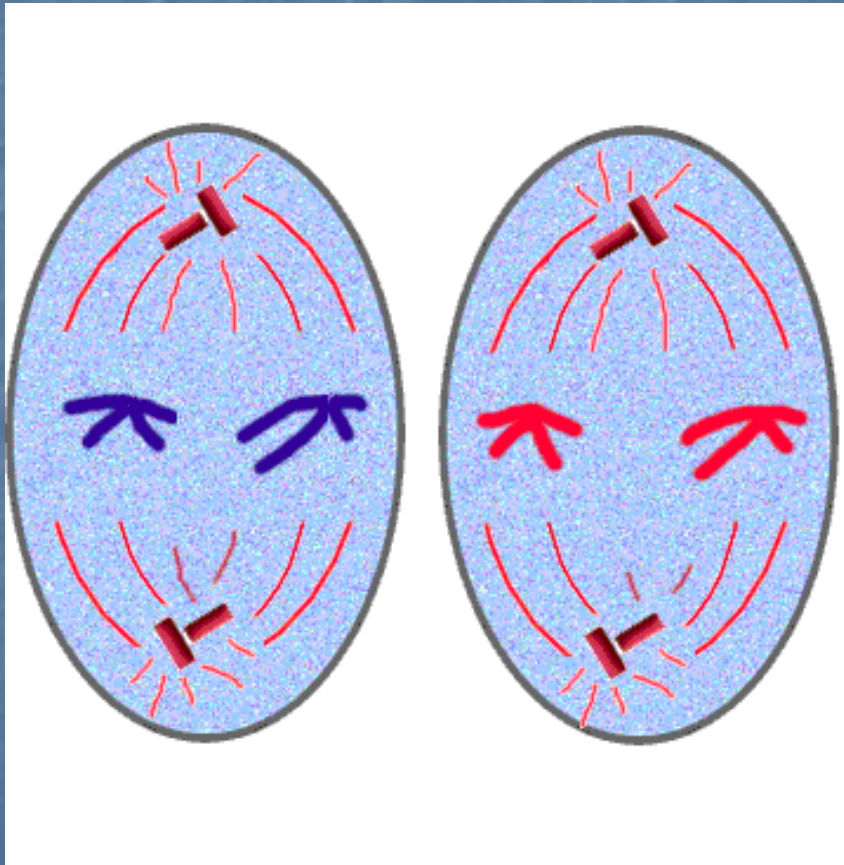
The chromosomes move to opposite ends of the cell.

# Meiosis Telophase I & Cytokinesis



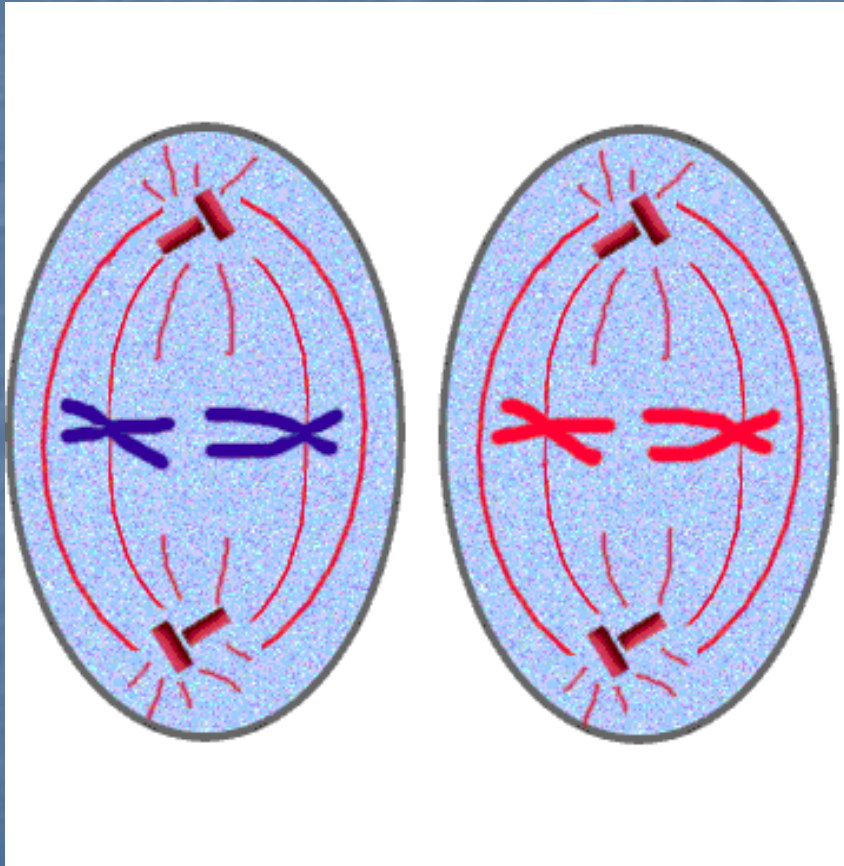
The cell begins to divide into two daughter cells. It is important to understand that each daughter cell can get any combination of maternal and paternal chromosomes.

# Meiosis Prophase II



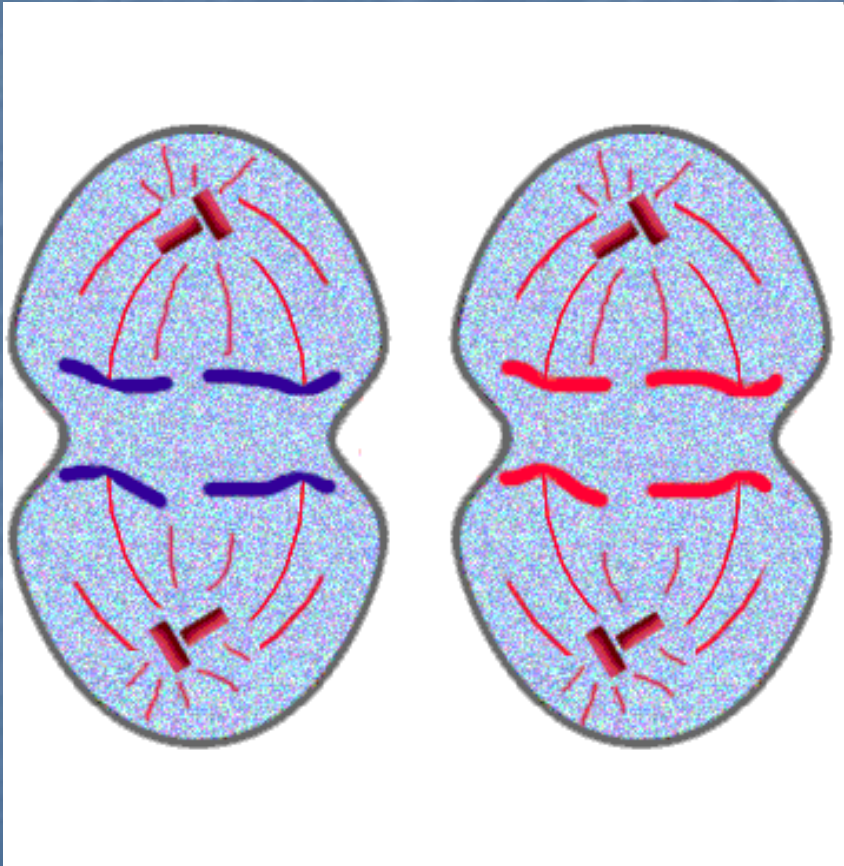
The cell has divided into two daughter cells.

# Meiosis **Metaphase II**



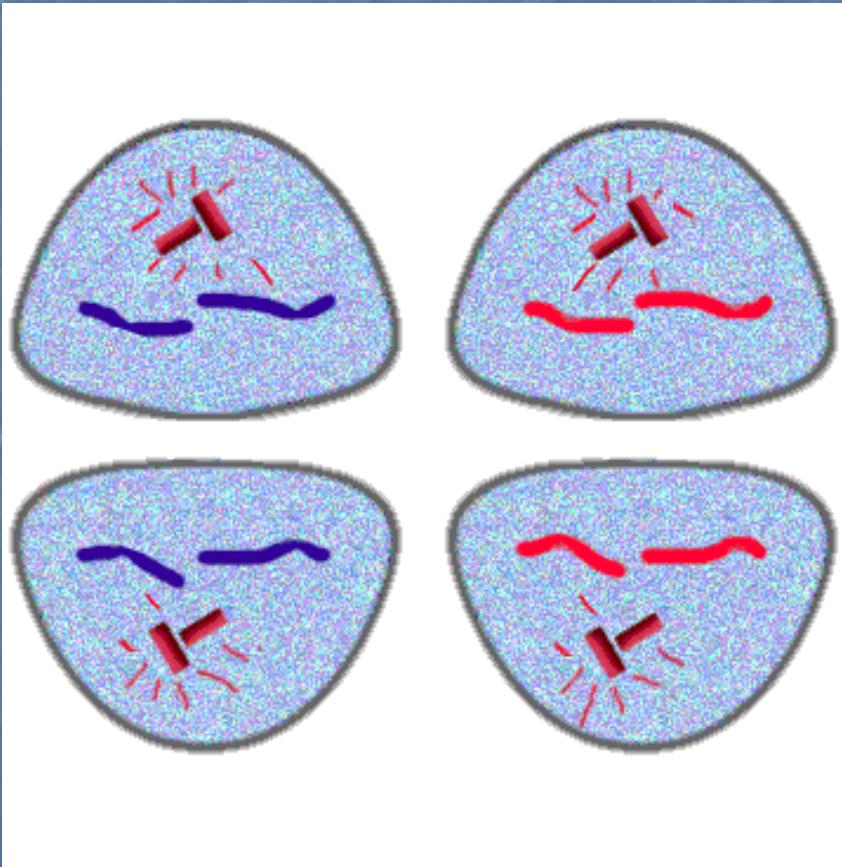
As in Meiosis I, the chromosomes line up on the spindle fibers.

# Meiosis **Anaphase II**



The two cells each begin to divide. As in Meiosis I, the chromosomes move to opposite ends of each cell.

# Telophase II & Cytokinesis



With the formation of four cells, meiosis is over. Each of these prospective germ cells carries half the number of chromosomes of somatic cells.