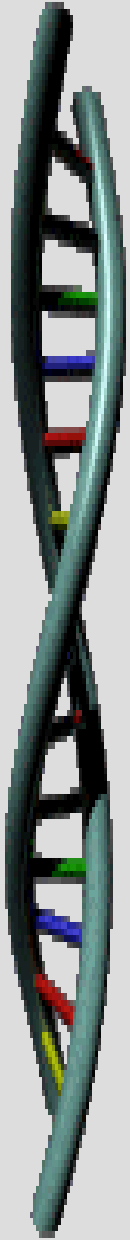
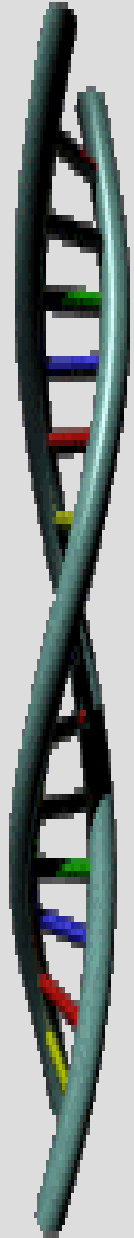


Mitosis and Meiosis

How You Came To Be

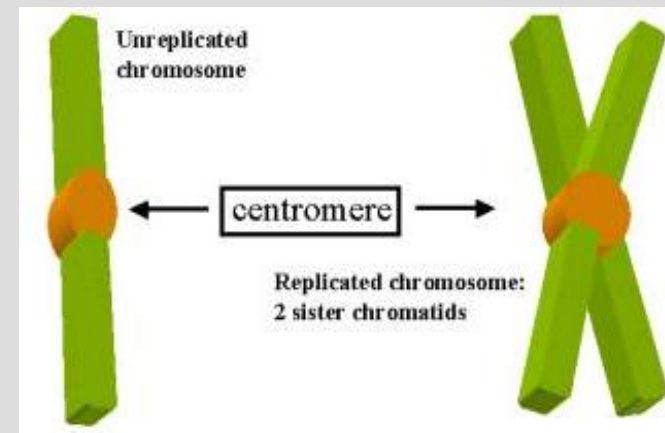
- You have 46 chromosomes in each of your cells' nucleus
 - 23 from your mother
 - 23 from your father
- A chromosome is made of proteins and a single strand of DNA
- DNA is the genetic make-up that makes you unique





Mitosis

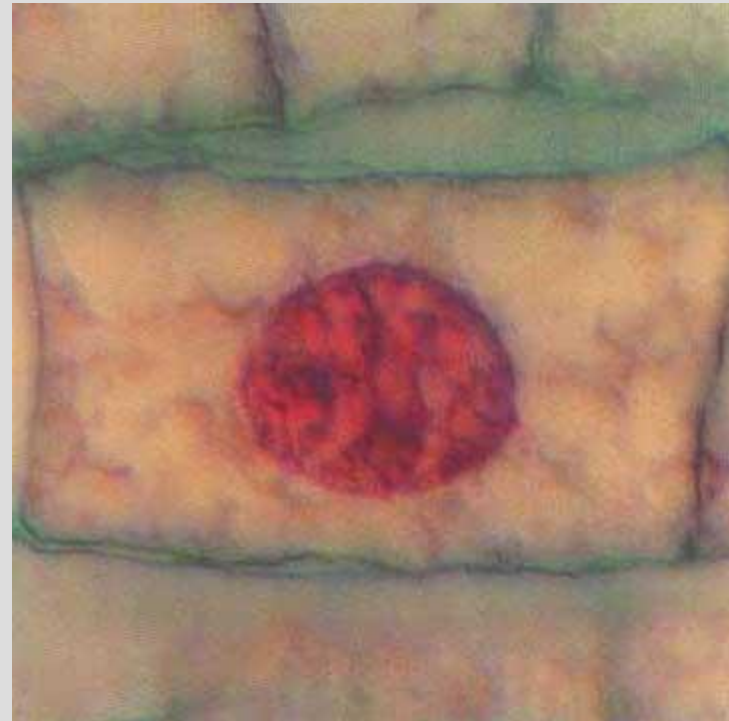
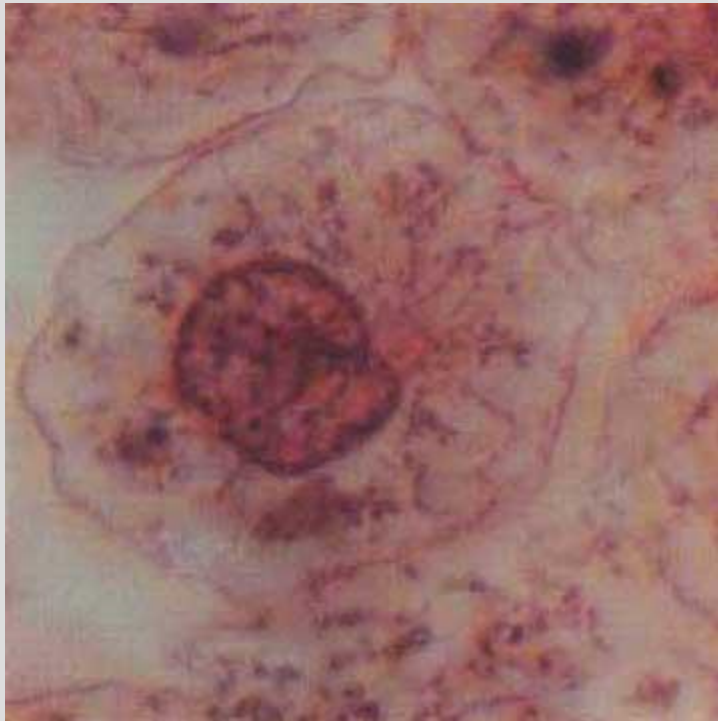
- Mitosis: Nucleus splitting into copies of itself
 - Useful because it is how cells multiply
1. Interphase
 - NOT technically a phase of mitosis
 - Cell replicates its chromosomes
 - Happens before mitosis



Mitosis Interphase

Animal cell

Plant cell



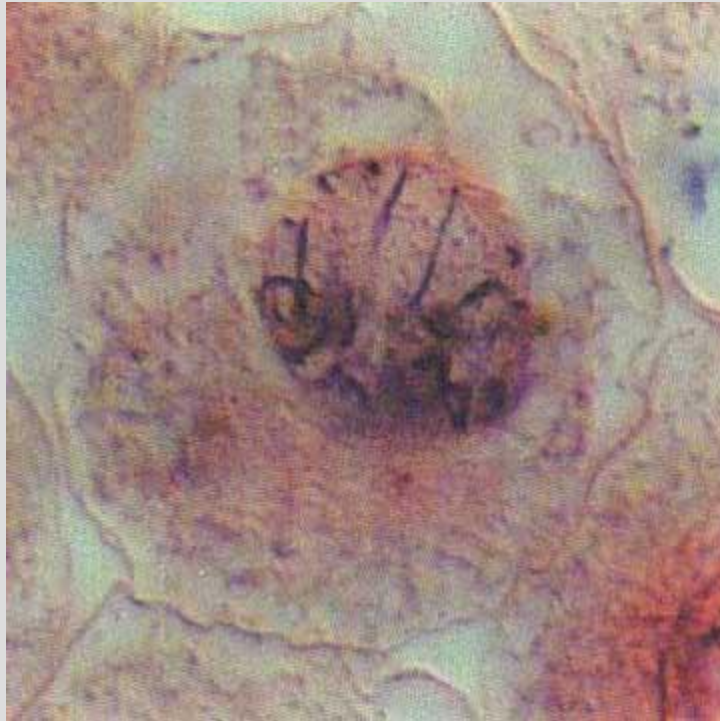


2. Prophase

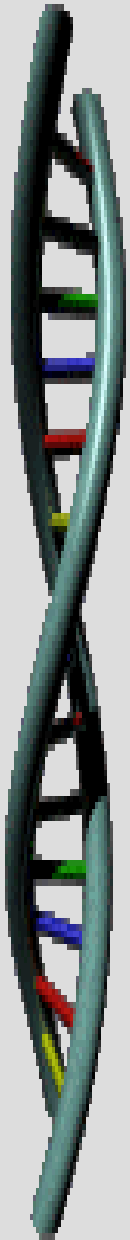
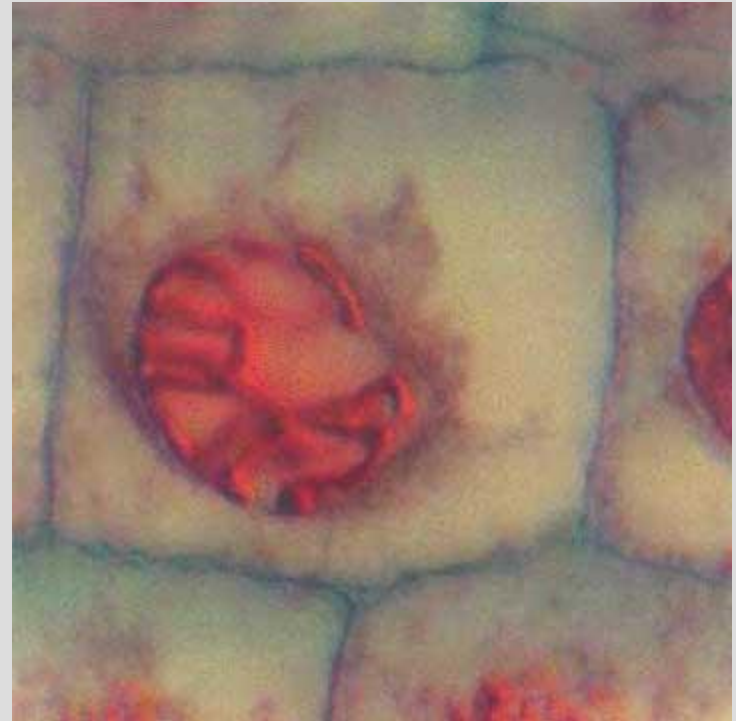
- Chromosomes condense to two chromatids attached at a point
- Nuclear envelope dissolves
- Centrioles begin to separate and form spindles that begin to attach to the chromosomes

Mitosis Prophase

Animal cell



Plant cell



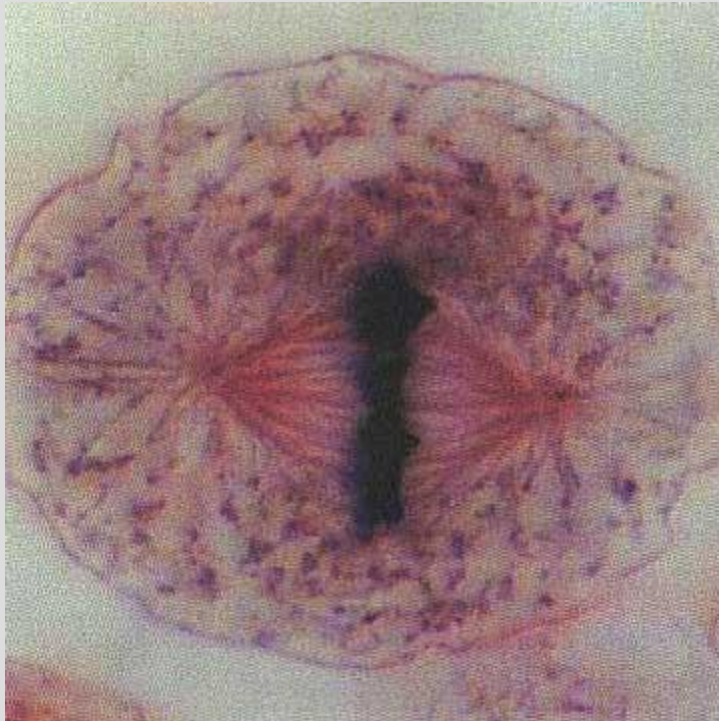


3. Metaphase

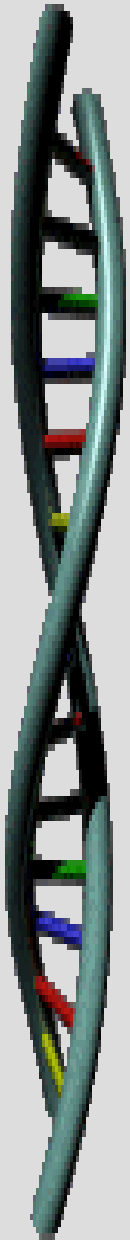
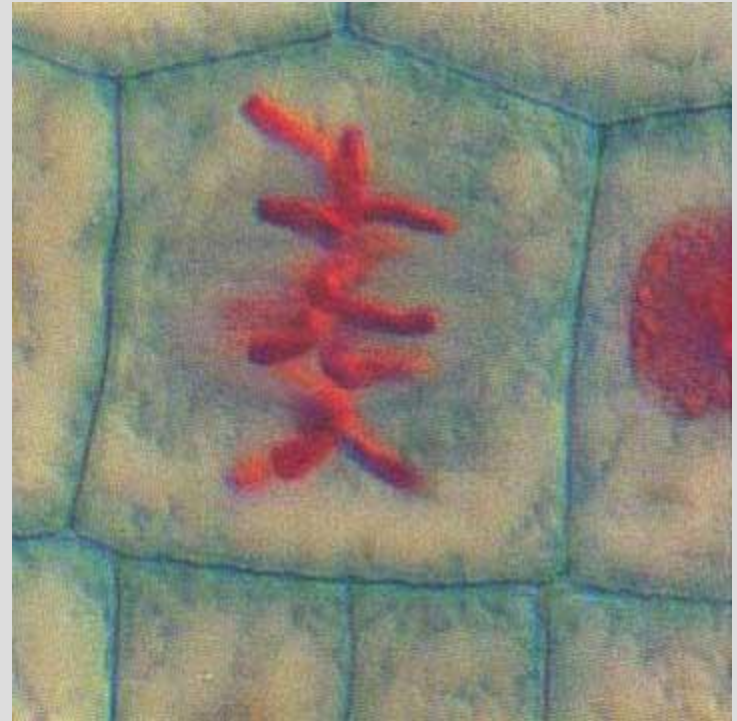
- The chromosomes attach to the spindles
- All the chromosomes line up at the equator of the nucleus

Mitosis **Metaphase**

Animal cell



Plant cell





4. Anaphase

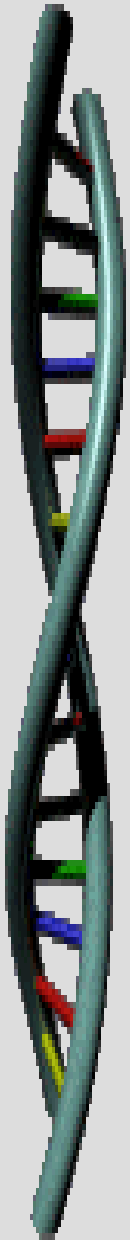
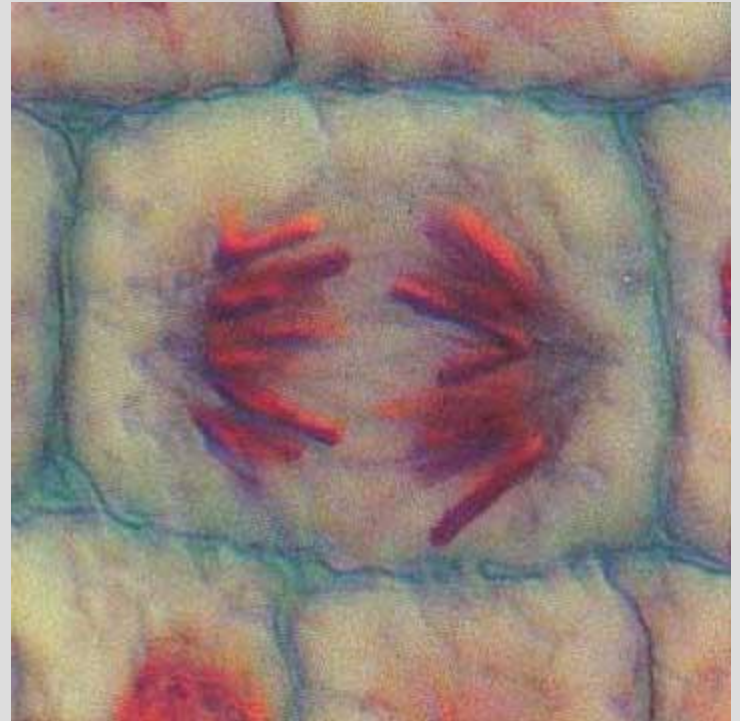
- Spindles shorten and pull the chromosomes to the poles of the cell
- Spindles elongate as well as the cell itself

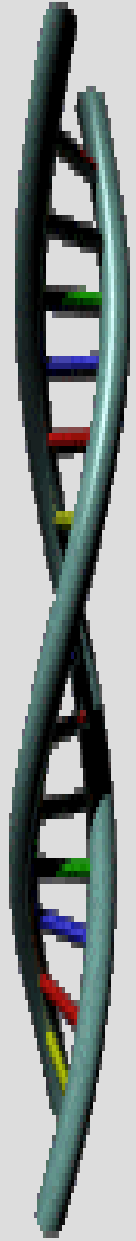
Mitosis Anaphase

Animal cell



Plant cell



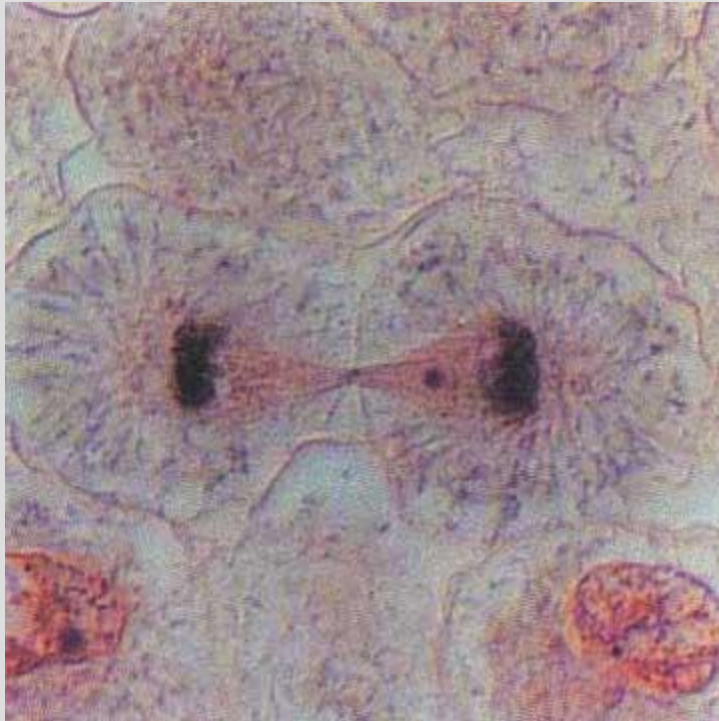


5. Telophase

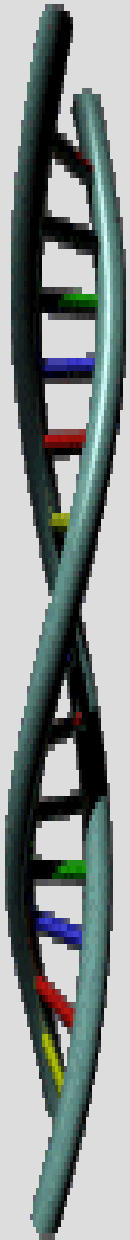
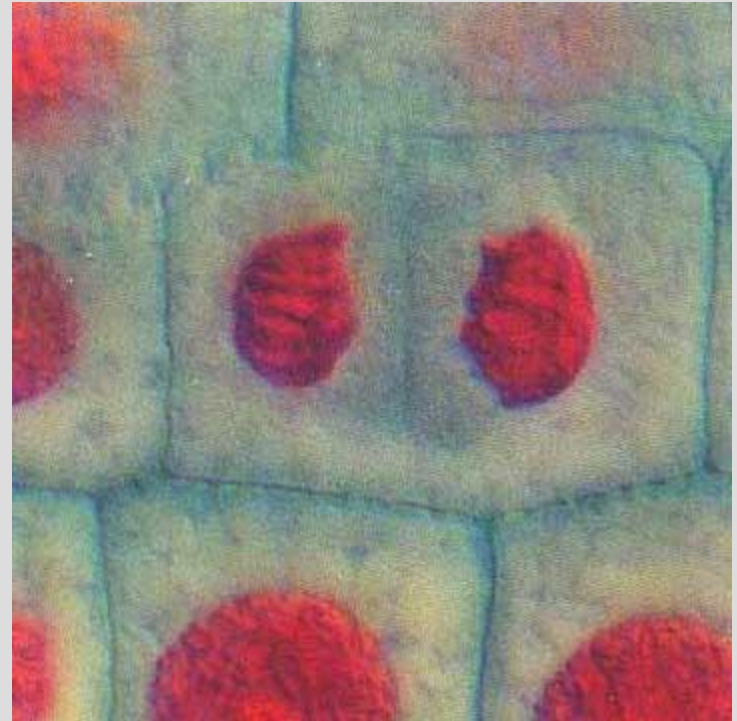
- Chromosomes reach the poles of the cell and begin to dissipate
- Cell continues to elongate
- Nuclear membranes form in opposite sides of the cell
- Nucleoli appear

Mitosis **Telophase**

Animal cell



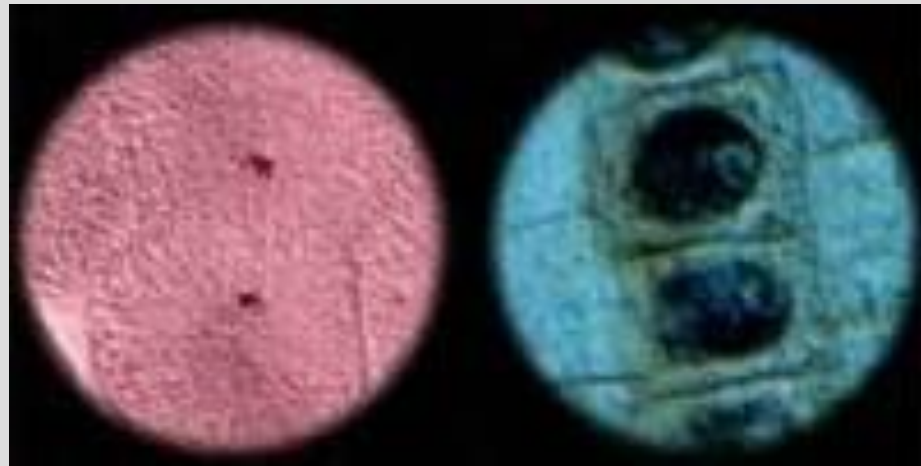
Plant cell



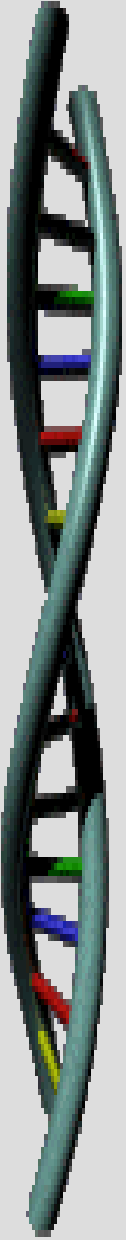


6. Cytokinesis

- NOT a phase of mitosis but follows after it
- Indentation forms at the equator
- Cell breaks in half
- We have two complete cells



REMEMBER!

- 
- **I**nterphase
 - **P**rophase
 - **M**etaphase
 - **A**naphase
 - **T**elophase
 - **C**ytokinesis



IPMATC

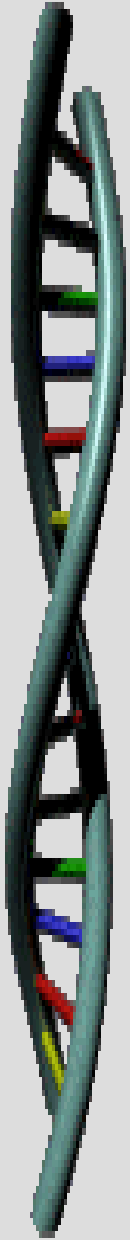
I Pay More At The Capital

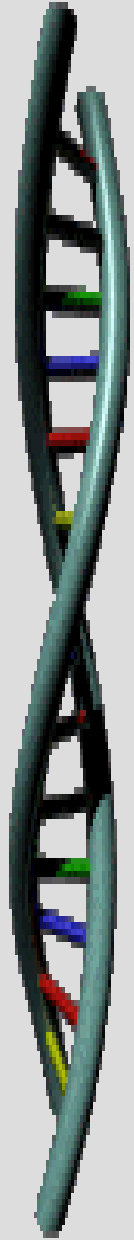


http://iknow.net/cell_div_education.html

Meiosis

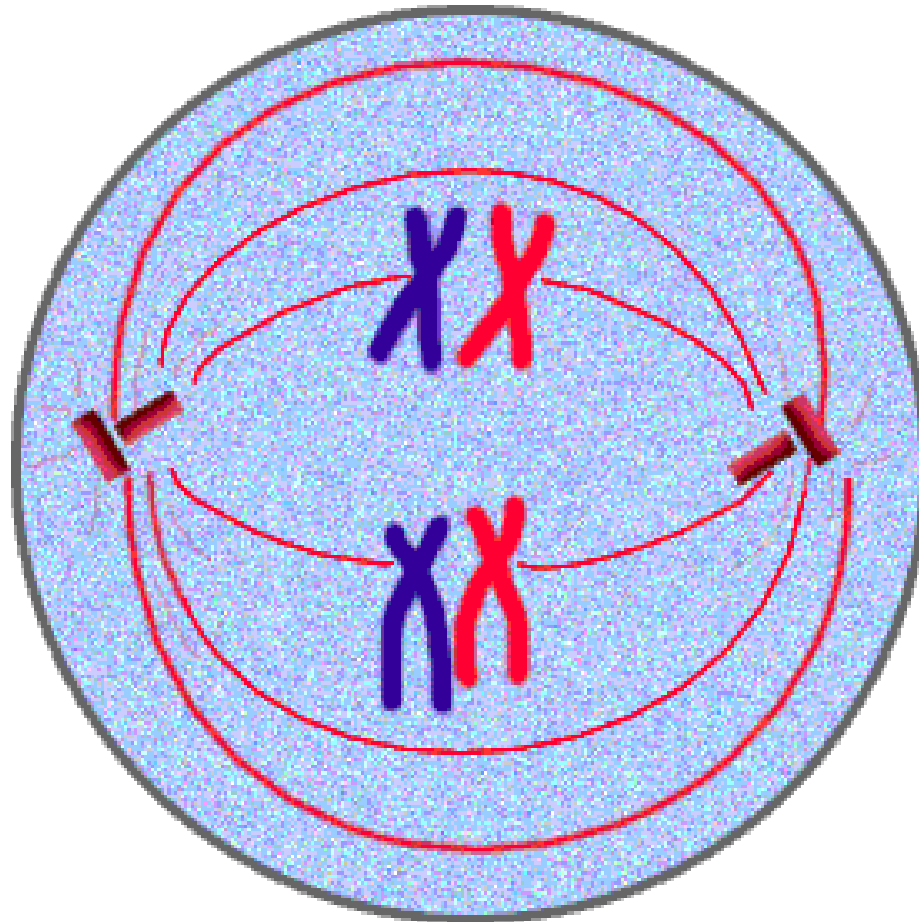
- Meiosis: A cell divides to produce cells with half the original genetic material
- Useful for sexual reproduction
- The dividing happens twice
 1. Interphase I
 - Once again, not a phase of meiosis
 - Cell replicates its chromosomes





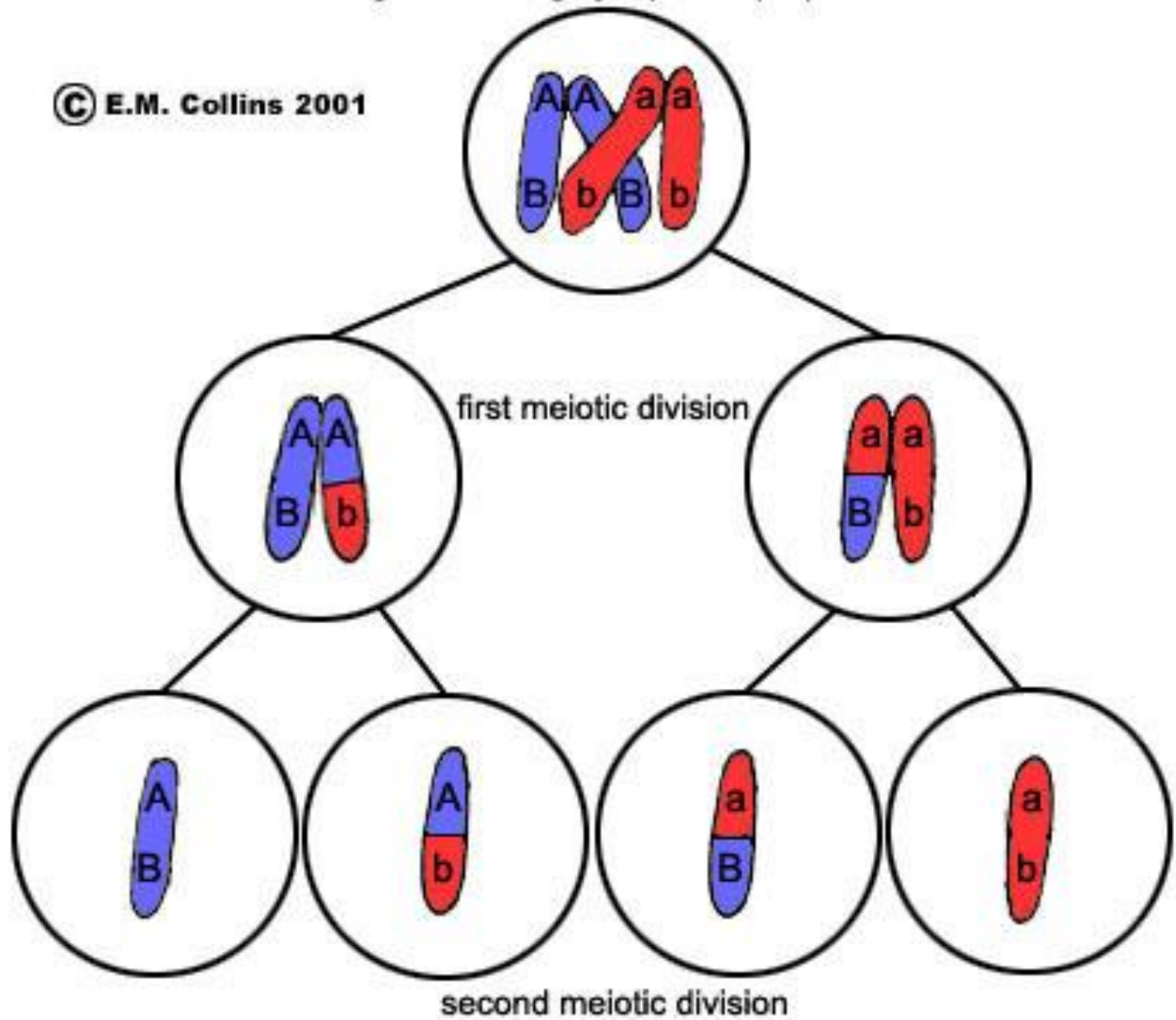
2. Prophase I

- Chromosomes condense
- Nuclear envelope goes away
- Spindles start to form
- Pairs line up next to each other
- DNA sequences from corresponding chromosomes are exchanged
 - Genes are transferred



crossing over during synapsis of prophase I

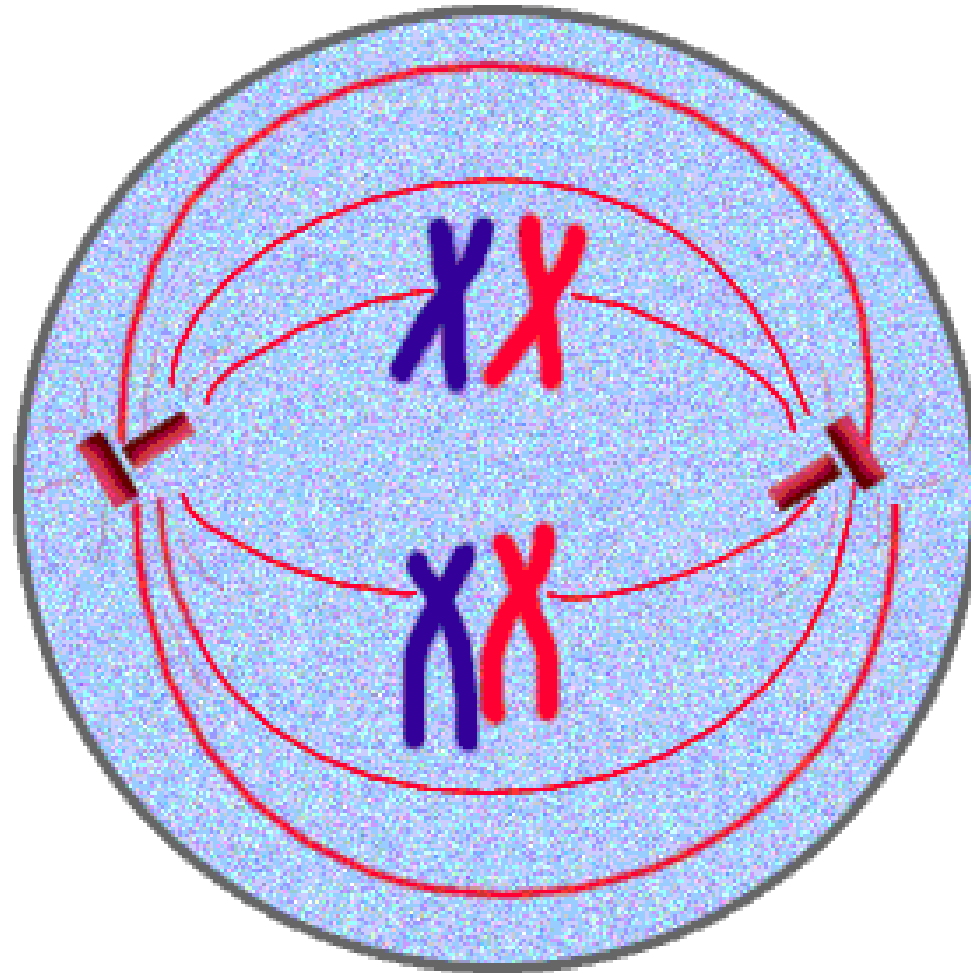
© E.M. Collins 2001





3. Metaphase I

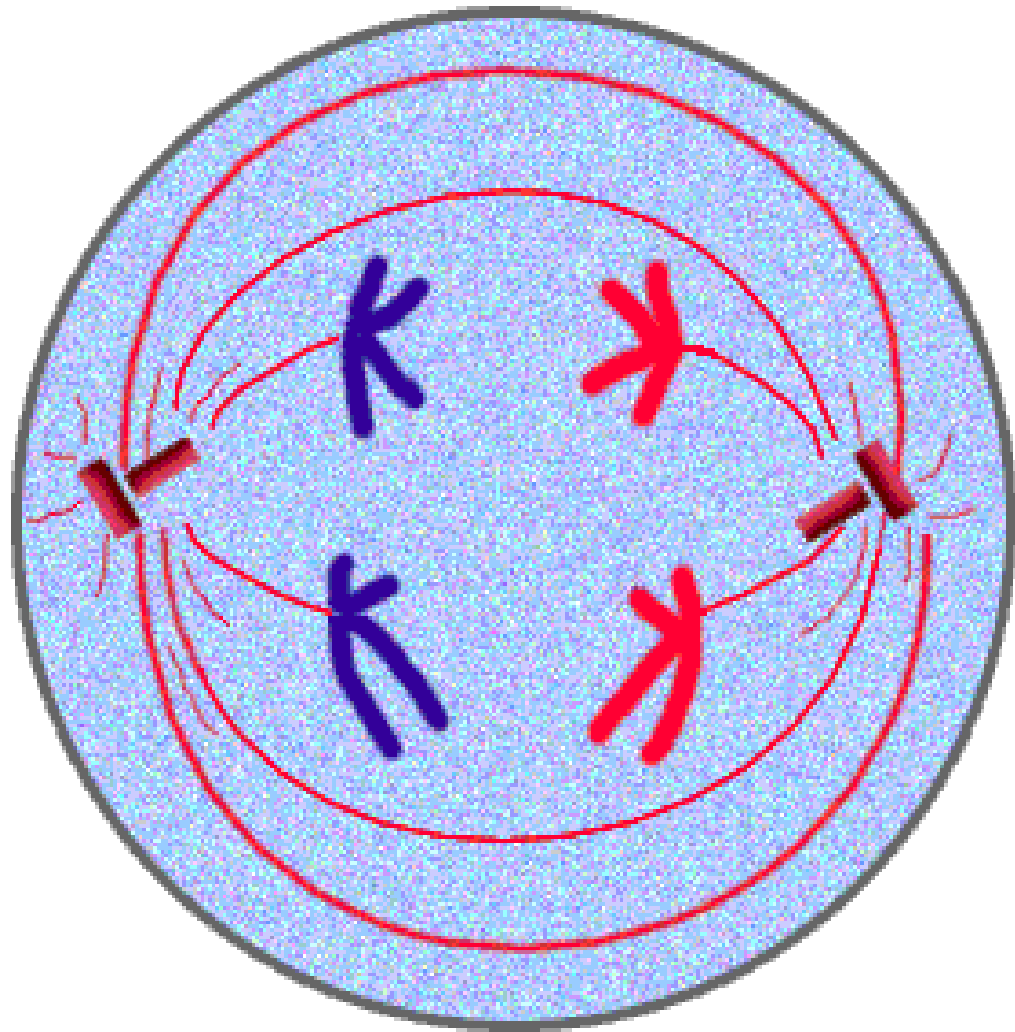
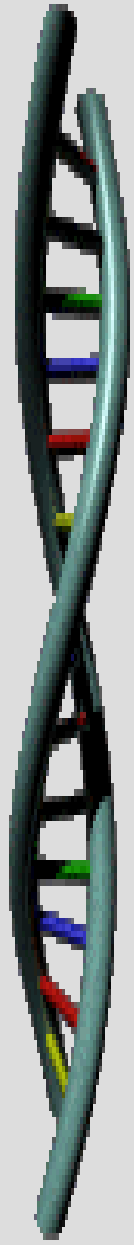
- Chromosomes attach to the spindles randomly
- The chromosomes line up on either side of the equator

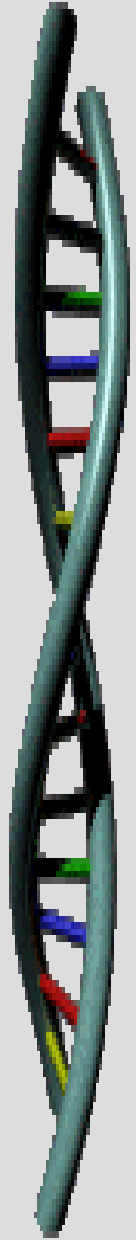




4. Anaphase I

- The chromosome separate but are still pairs
- The spindles shorten and pull the chromosomes towards the poles

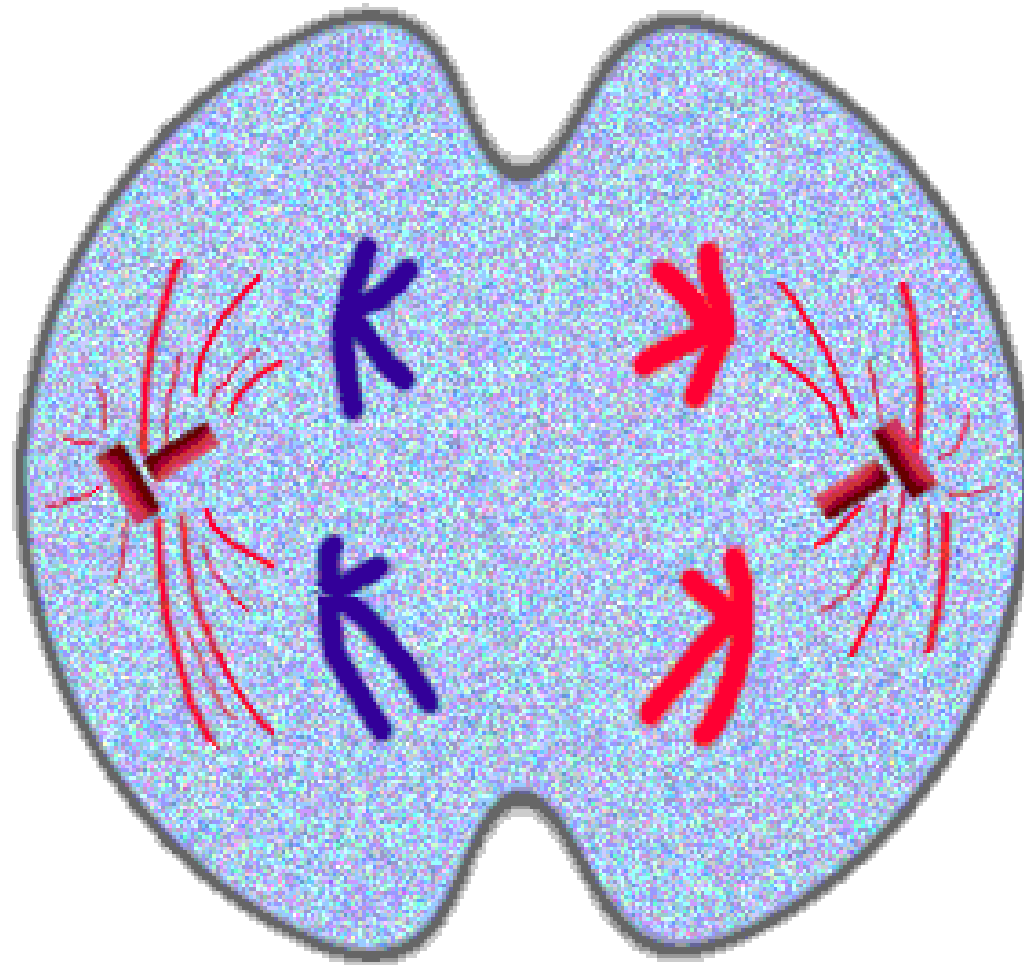
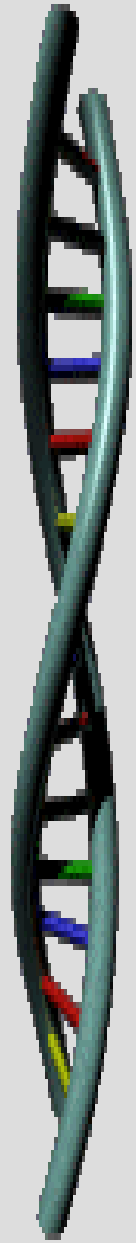


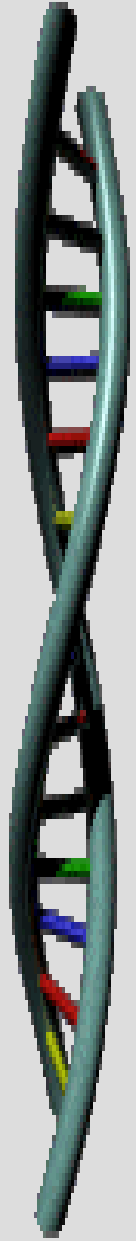


5. Telophase I

- Chromosomes dissipate
- Nuclear membrane reforms
- Each pole now has DNA from mother and father for a complete set but only half the amount of chromosomes
- The gene exchange means that the new cells are not identical

6. Cytokinesis happens



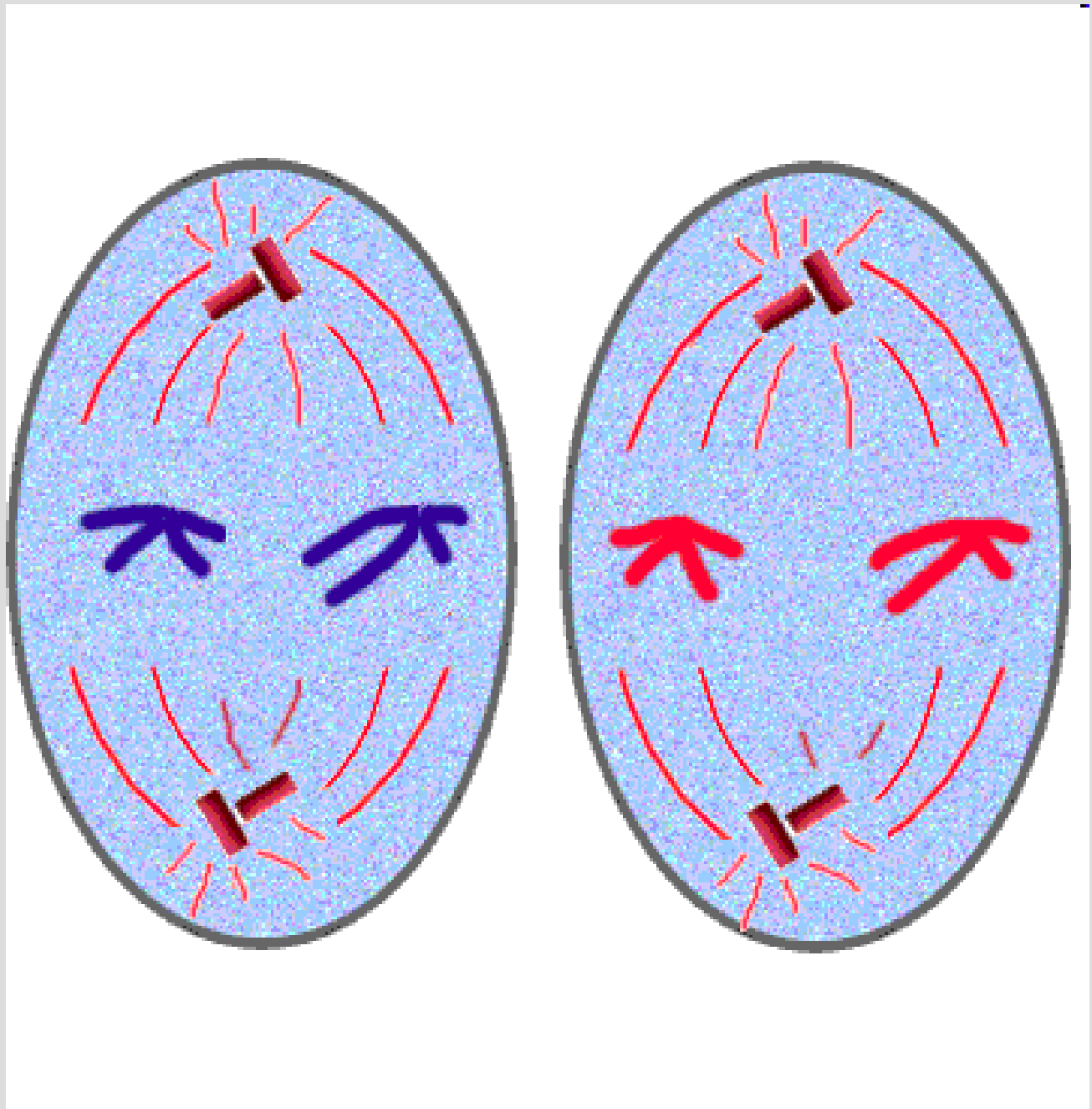
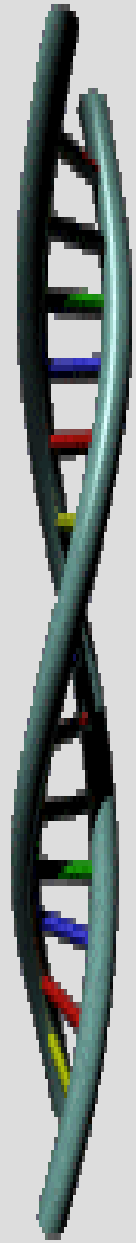


7. Interphase II

- Chromosomes do NOT replicate

8. Prophase II

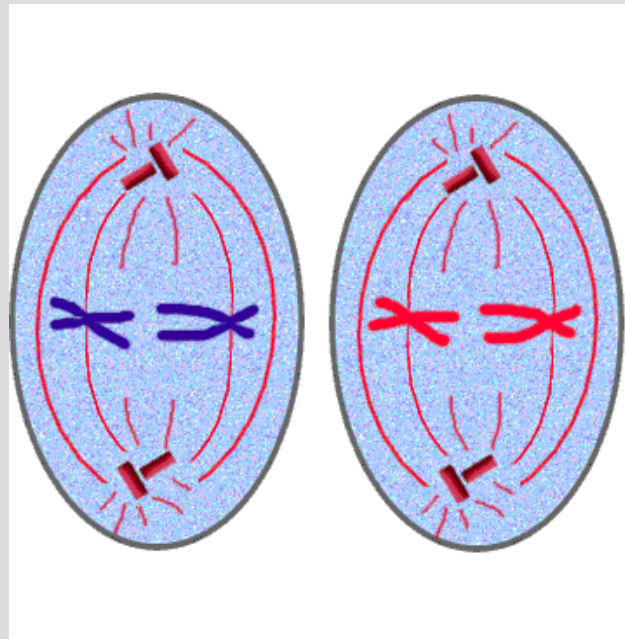
- Chromosomes condense
- Spindles form
- Nuclear membrane goes away
- NO exchange of genetic material
- Spindles attach to both sides of the chromosomes

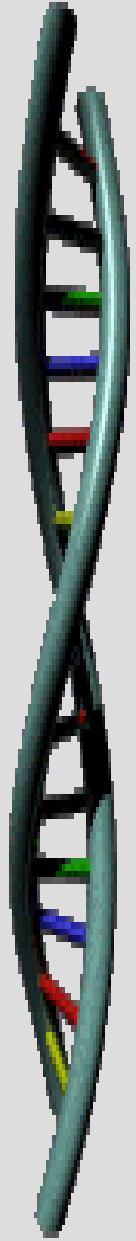




9. Metaphase II

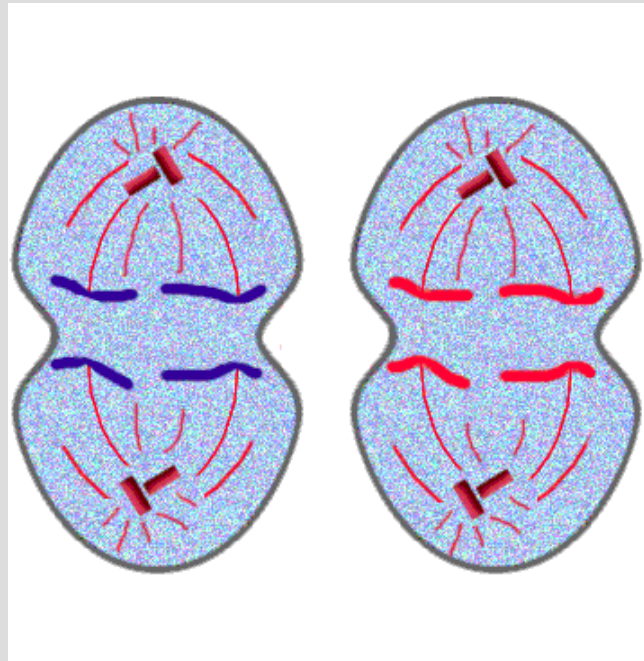
- Chromosomes line up at the equator
- Spindles pull on each of the chromosomes from both directions

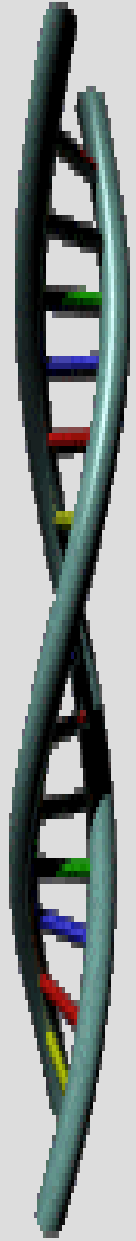




10. Anaphase II

- Spindles pull the chromosomes apart
- Chromosomes travel to opposite ends of the cells

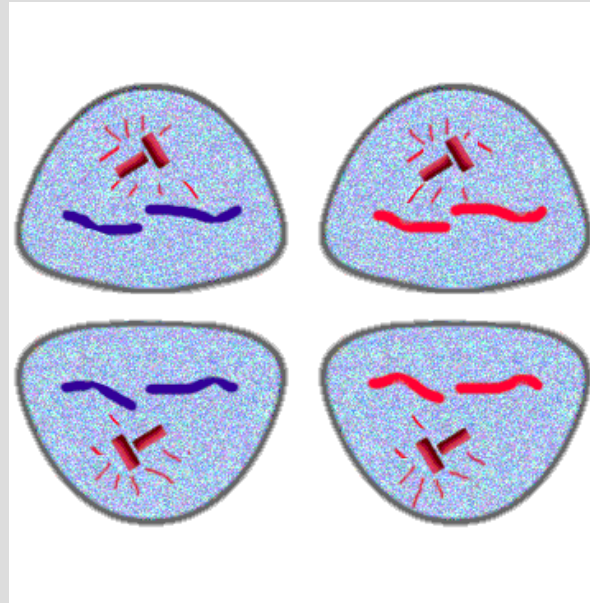


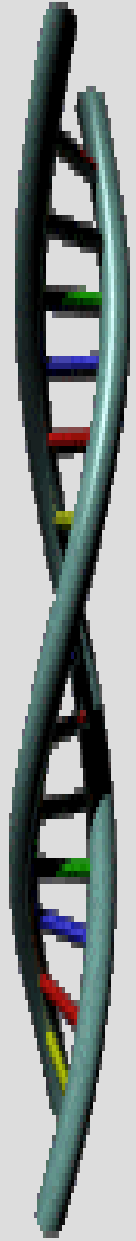


11. Telophase II

- Chromosomes dissipate
- Nuclear envelopes reform

12. Cytokinesis happens once again



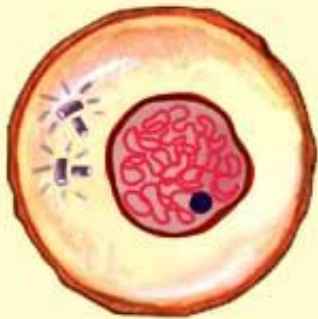


You end up with four cells that have half the genetic material from the original cell. Each of the cells are genetically different in some ways because of the cross over. Your four new cells are called gametes. These cells can now be used to create a new life form.



http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter3/animation_stages_of_meiosis.html

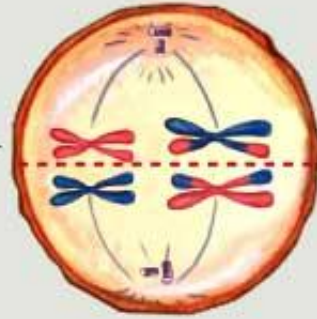
MEIOSIS I



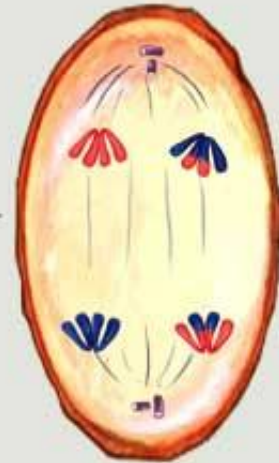
END OF
INTERPHASE



PROPHASE I

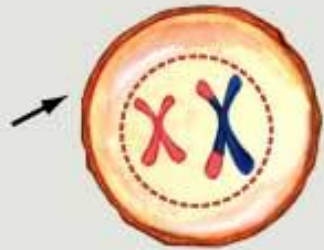


METAPHASE I



ANAPHASE I

MEIOSIS II



TELOPHASE I



PROPHASE II



METAPHASE II



ANAPHASE II



TELOPHASE II

