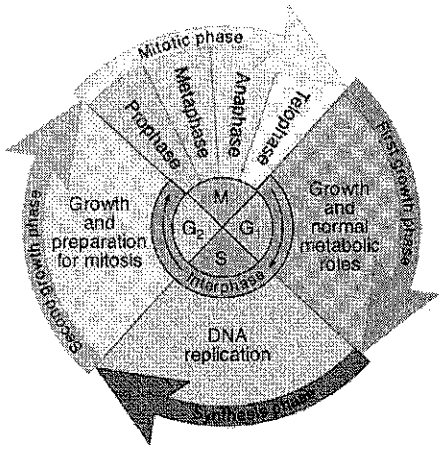
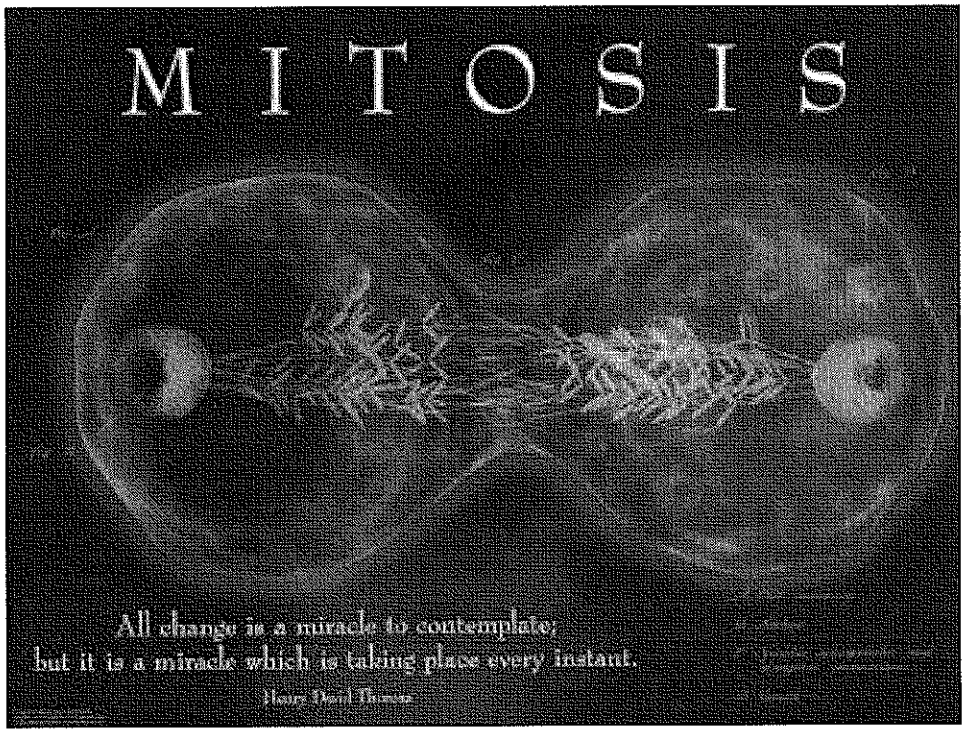
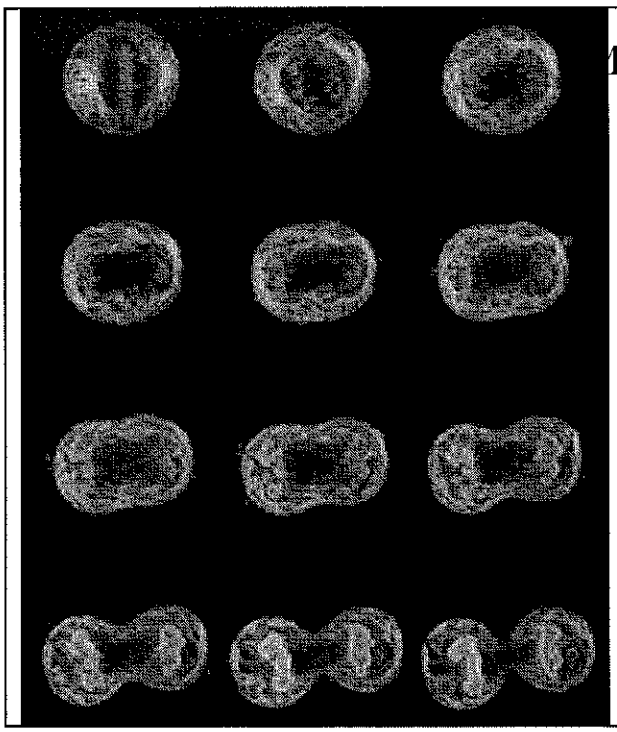
The cell cycle:



- The lifespan of different cell types varies
  - some cells such as nerve cells never divide once they are formed.
- This figure represents the lifespan of a typical cell.
  - From the point of view of mitosis, the cell is in Interphase and is "resting", but this is actually the time when the cell is performing its normal bodily function, whatever that may be.





Mitosis =The process which chromosomes organize and the nucleus of a cell divides

IDENTICAL to the parent cell they came from

type of Fission or asexual replication

Cell repair

growth of an organism

diploid

Cell Division

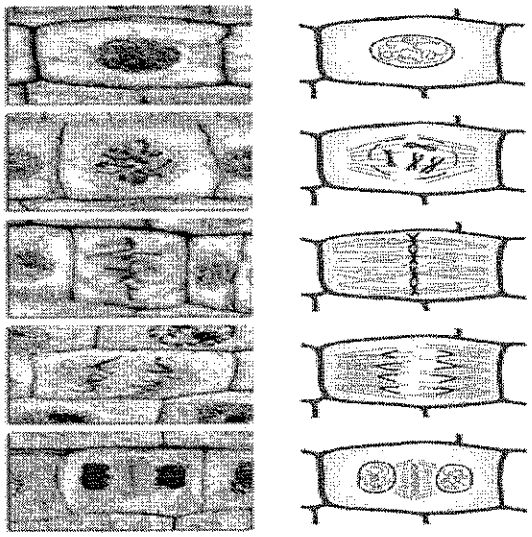
Occurs only in "somatic" or body cells.

- **First Occurs after a haploid sperm meets haploid egg**, a chain of events that begins with a single diploid cell and ends with an adult organism made of billions of cells is set in motion.
- The single cell divides into 2, and each of those 2 divide again, and this process continues geometrically along the following progression: 1, 2, 4, 8, 16, 32, 64, 128, and so on into the billions.

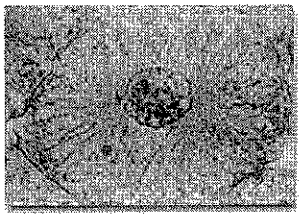
- Why?
  1. Growth
  2. Repair
     - Cells are constantly wearing out and getting damaged and unless an organism replaces them at least as fast as they are lost, a gradual deterioration will occur.
  3. Asexual Replication

Overview of the steps:

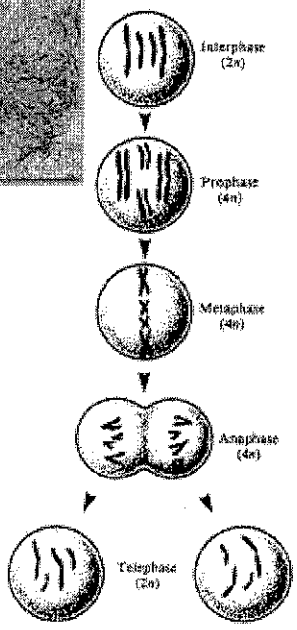
1. Interphase (G1, S, G2)
2. Mitosis
   - Prophase
   - Metaphase
   - Anaphase
   - Telophase
3. cytokinesis

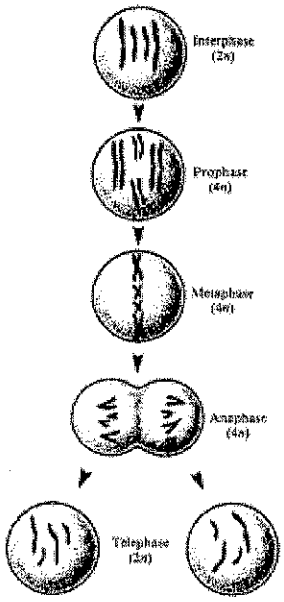


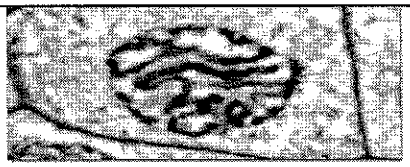
Interphase:



- Cells spend most of their life in "interphase"
- "Resting Stage" (meaning it is not replicating) instead the cell is:
  - growing
  - Developing
  - carrying out its function (PS!)
- During S Phase of interphase each chromosome undergoes **replication**





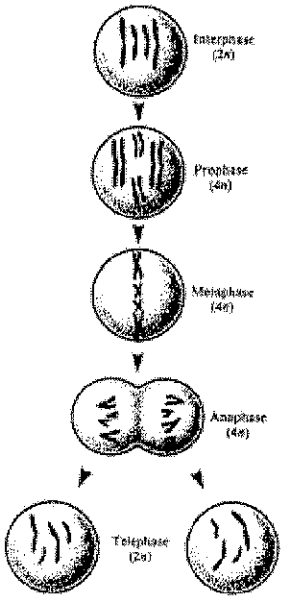


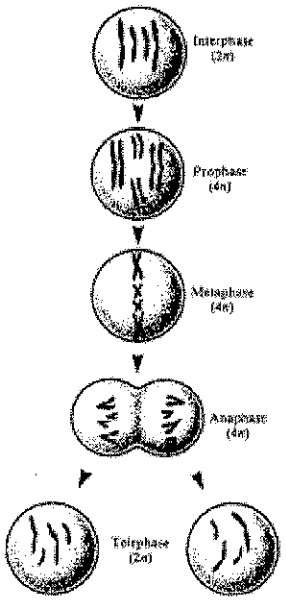
1st stage of MITOSIS =Prophase:

- Cell division begins
- Nuclear membrane disappears
  - The chromosomes coil and shorten, and become visible.
  - It becomes apparent that the chromosomes have duplicated.
  - Pairs of identical chromosomes remain attached to each other at the centromere
- Each chromosome is called a chromatid.

Metaphase:

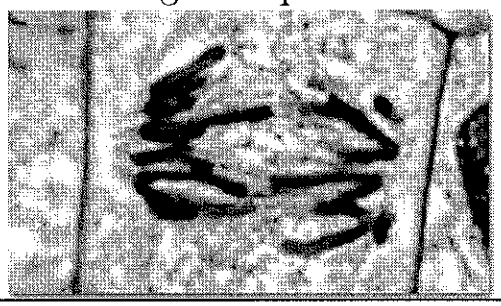
- Chromosomes line up along the center of the cell.
- centrioles form at the poles of the cell
  - they produce spindle fibers which attach to the centromeres of each chromosome pair.





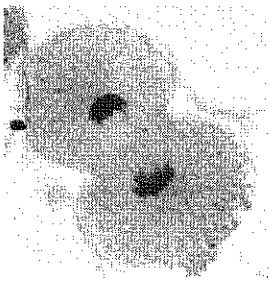
Anaphase:

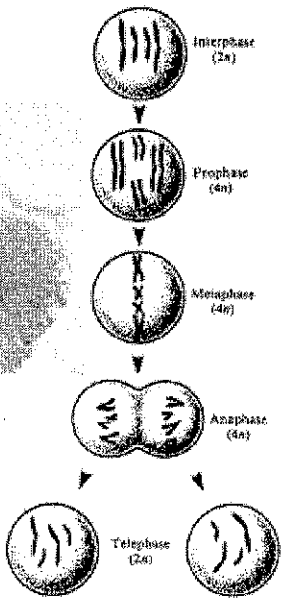
- The paired chromosomes split at the centromere
- The two halves move apart and migrate along the spindle fibers to opposite sides of the cell.
- At the same time, the center of the cell begins to pinch.



Telophase:

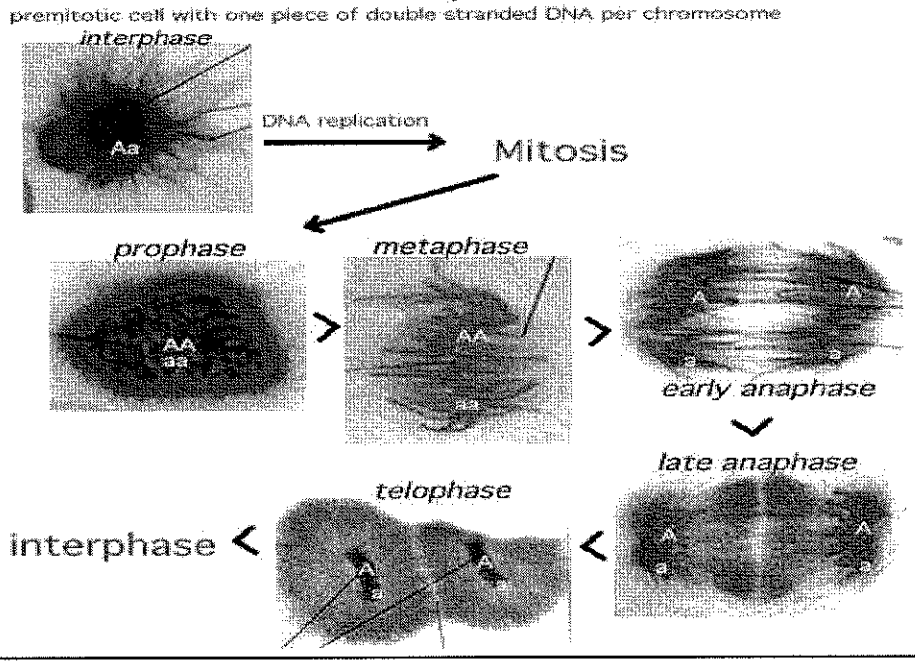
- Cell division occurs
- Two identical cells result
- Cells return to Interphase and prepare for another round of division.



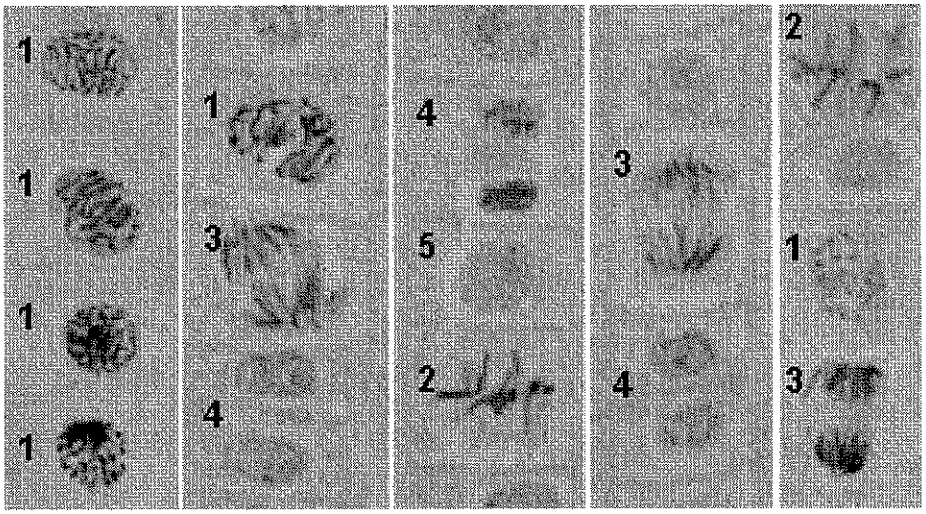


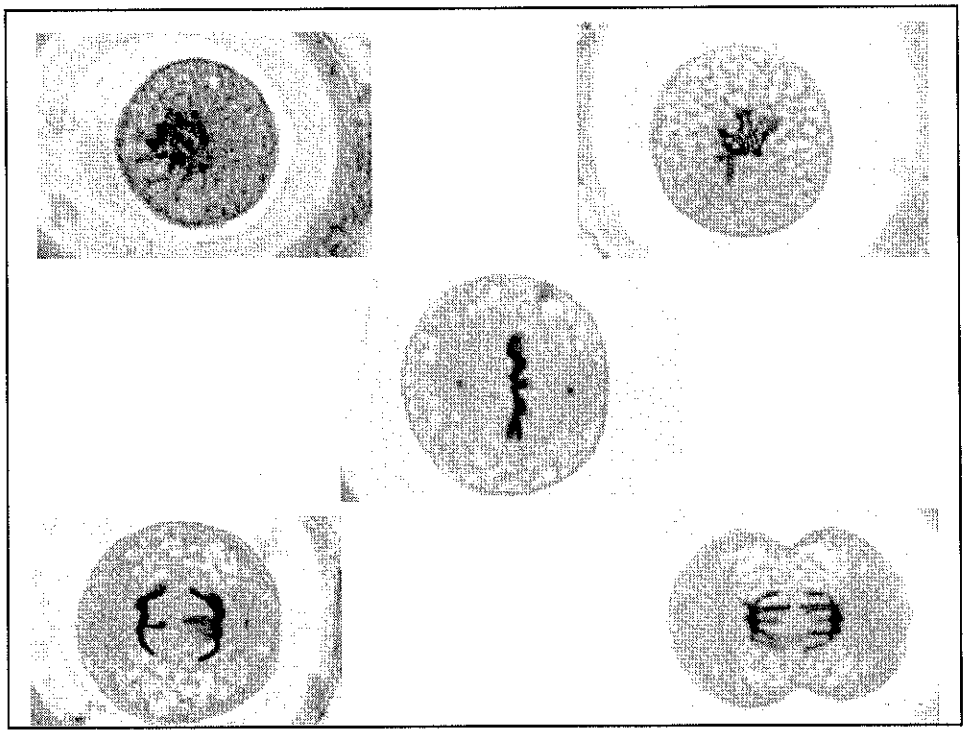
How does it actually look in the cell?

premitotic cell with one piece of double stranded DNA per chromosome

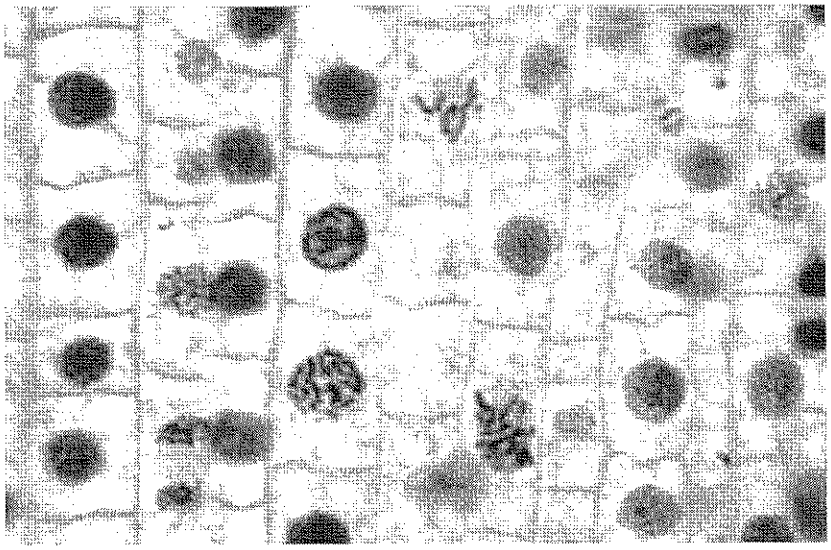


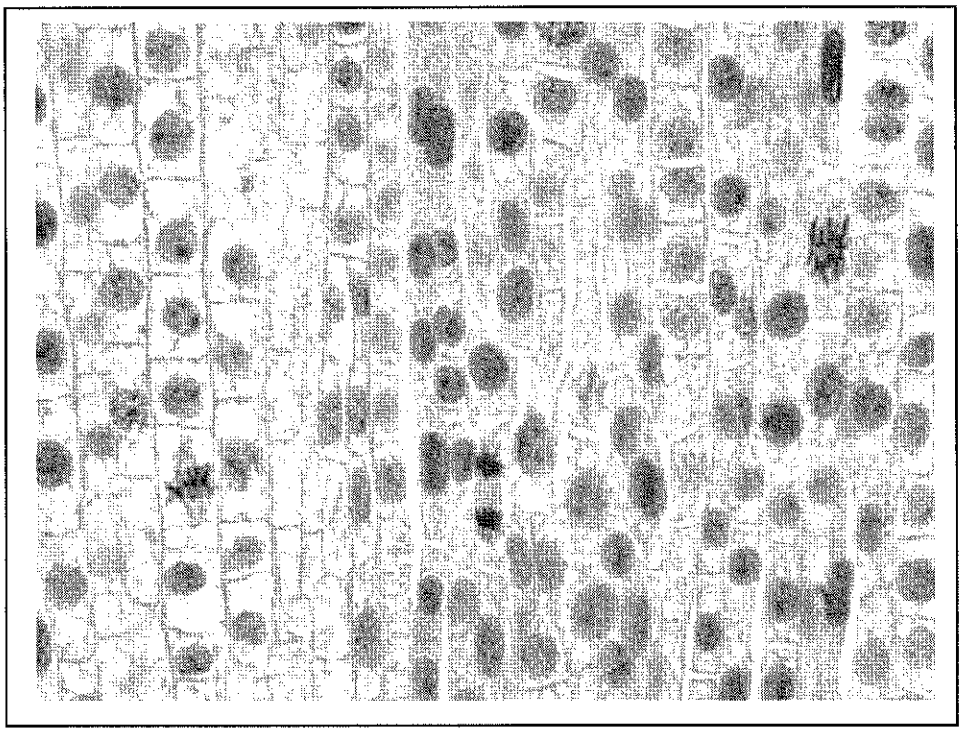
Lets look at pictures that show the cell at the various stages of mitosis:



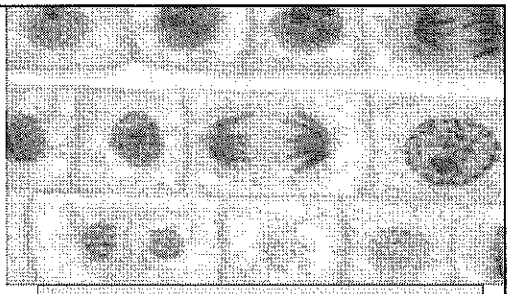


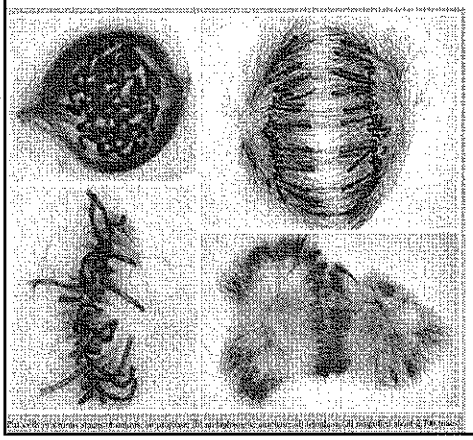
Identify the various stages of mitosis in the plant cells:





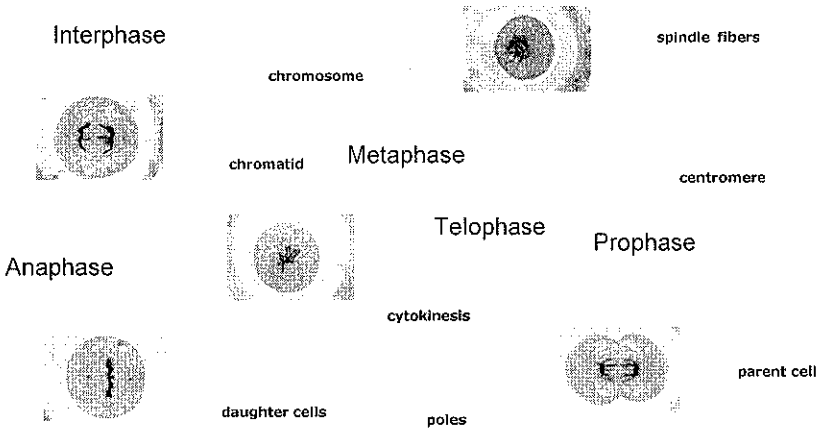
- Centrioles are found only in animal cells.
  In plants the nuclear and cell division are mainly localized in special regions called meristems.





- The division process is essentially the same for plants and animals.
- The main difference comes when it is time for cytoplasmic division.
  - A plant cell builds a new cell wall to divide its two daughter cells
  - an animal cell will pinch in two, or cleave.

Mitosis Scramble – see next slide for assignment!



Assignment: Sequence the stages of Mitosis

1. Arrange the pictures of mitosis in the order they would happen. You have learned that mitosis has four steps, with interphase in-between.
2. Have the order checked before you move onto the next step.
3. Under each picture label each phase.
4. Pick one or more cells and label the following parts: chromosome, centromere, chromatid, cytokinesis, parent cell, daughter cells, spindle fibers, and poles. Be sure to include **arrows**.

At the bottom of the your paper—answer the following questions:

5. What is the purpose of mitosis?
6. Compare the number and kinds of chromosomes at the beginning and at the end of mitosis.

References:

- http://jan.ucc.nau.edu/~lrm22/lessons/mitosis_notes/mitosis_and_meiosis.html
- http://www.moundsviewschools.org/irondale/Science/bueltel/bueltel.ppt#257,2,Mitosis
- http://images.google.com/imgres?imgurl=http://www.ndpteachers.org/perit/Mitosis%255BAnimalCell%255D.GIF&imgrefurl=http://www.ndpteachers.org/perit/biology_image_gallery1.htm&h=520&w=633&sz=260&hl=en&start=6&um=1&tbnid=FFmyoGgz4BUv3M:&tbnh=113&tbnw=137&prev=/images%3Fq%3Danimal%2Bmitosis%26svnum%3D10%26um%3D1%26hl%3Den%26rlz%3D1T4ADBF_enUS218US219%26sa%3DN