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Key

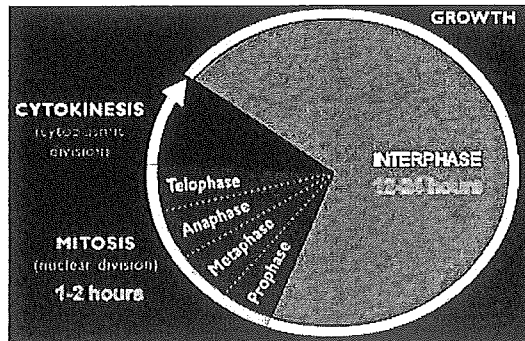
Notes The Cell Cycle and Mitosis

Cells Divide to Make Identical Copies

Why?

- a) Repair/ replacement of **BODY** tissue/cells
- b) growth of organism
- c) Reproduction by some asexual organisms

Overview of the Cell Cycle



The cell cycle includes:

- 1) Interphase 2) Mitosis 3) Cytokinesis

1) INTERPHASE – occurs before cells divide!

- longest phase of the cell cycle where cell carries out important functions necessary for survival and prepares for cell division
- Cell increases in size
- Organelles are duplicated
- DNA is replicated and exists as chromatin -loosely coiled strands of DNA

DNA is COPIED!

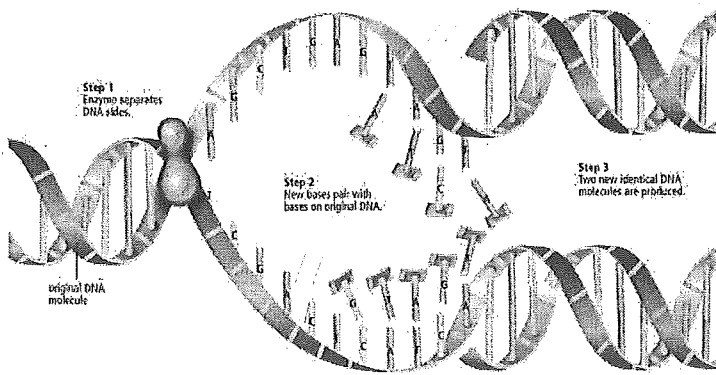


Figure 5.5 During replication, the steps of the DNA ladder break apart with the help of an enzyme.

STEPS:

1. Enzyme separates DNA sides
2. New bases pair with bases on original DNA
3. Two new identical DNA molecules are produced

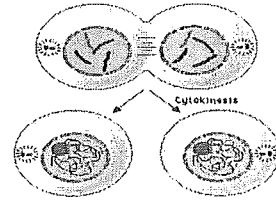
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2) MITOSIS - Nuclear Division

Stages of Mitosis: P M A T (pro phase, meta phase, ana phase, telo phase)

3) CYTOKINESIS - Cell division

- Cytokinesis is the splitting of the cytoplasm
- In animals the cell membrane **pinches** in middle dividing the cell into two.
- In plants a cell plate grows across the middle of cell, resulting in the formation of cell walls between two daughter cells.



The RESULT OF CELL DIVISION: Two identical daughter cells that have the same number and type of chromosomes as the parent cell!

In diagram below label the cell life cycle stages and the phases of mitosis!

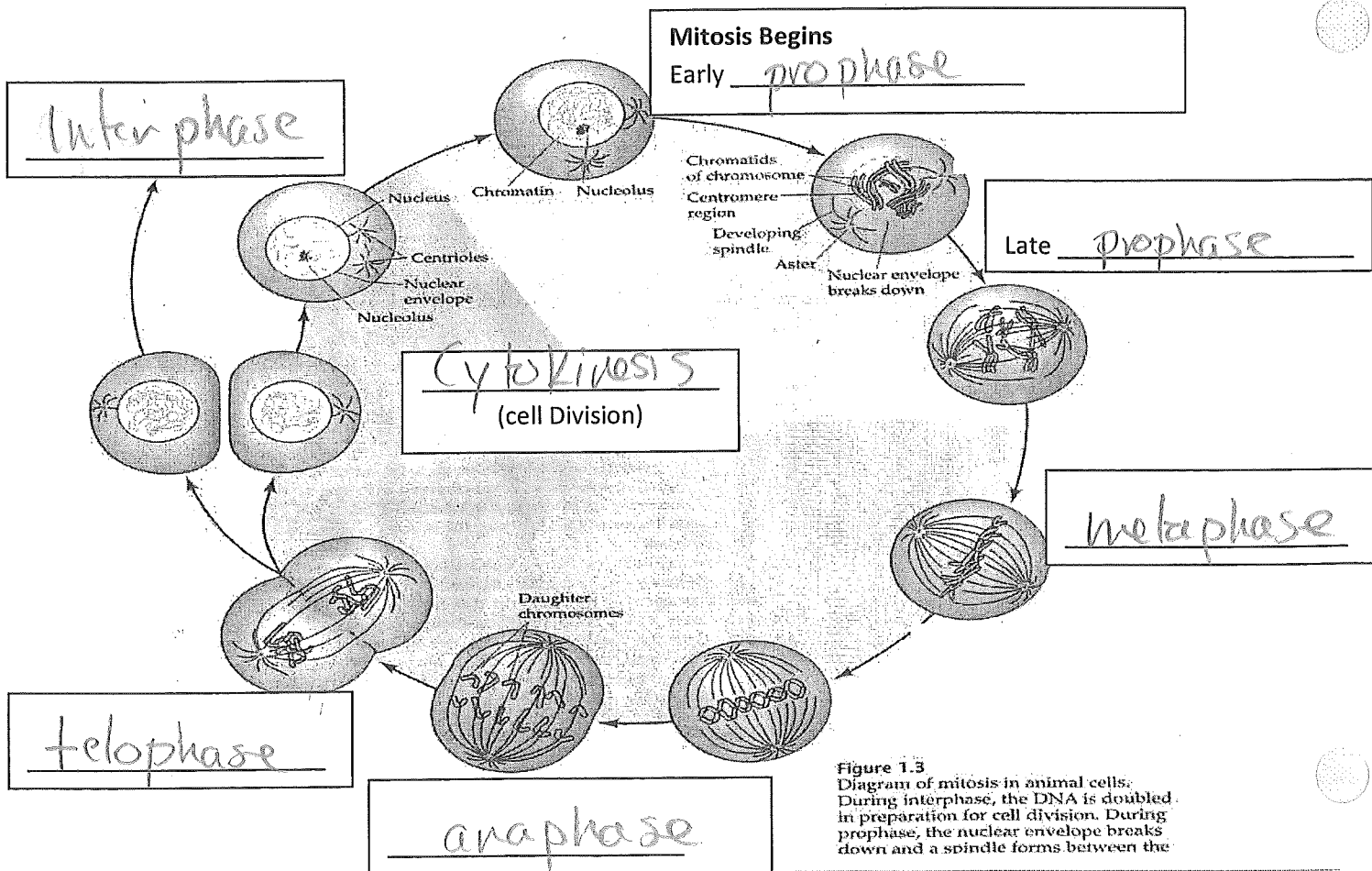


Figure 1.3
Diagram of mitosis in animal cells. During interphase, the DNA is doubled in preparation for cell division. During prophase, the nuclear envelope breaks down and a spindle forms between the

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(refer text pgs 156-158)

1) Complete the blanks below using the following terms: Some terms could be used more than once!

straight, pole(s), reform, chromatin, centrioles, sister, centromere, disappear, contraction of spindle fibres, chromatids, separate, opposite, X-shaped, nucleus, middle, cytokinesis, anaphase, telophase, middle, prophase, break down, chromosomes, spindle, two, nuclear

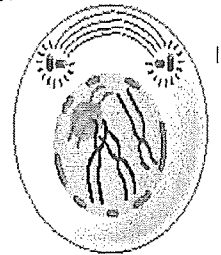
2) Sketch 4 chromosomes at each stage and the important cell structures involved in that stage of MITOSIS. Illustrate what the cell looks like at each stage (in boxes). Refer to textbook/internet!

Mitosis - the splitting of the nucleus

P- Prophase

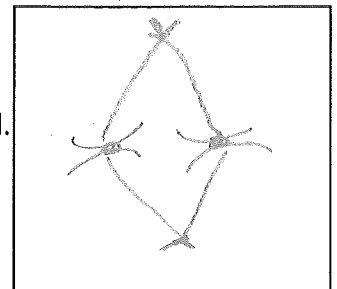
- The Chromatin (unravalled DNA) in the nucleus, condenses to form X-Shaped chromosomes.
- As this is happening the nucleolus begins to disappear
- nuclear membrane breaks down and disappears

- The Centrioles (in animal cells only) move to opposite ends (poles) of the cell.
- spindle fibres form from the centrioles (animal cells) or poles (plant cells)
- Spindle fibres attach to chromosomes at their centromeres. (late prophase)



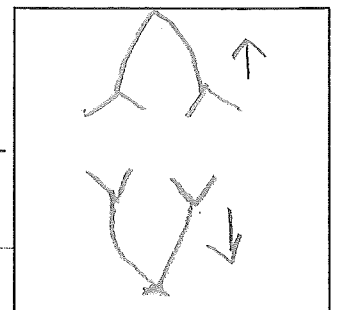
M - metaphase

- The tugging action of the spindle fibres pulls the X-SHAPED chromosomes into a straight line across the middle (equator) of the cell.



A- anaphase

- The chromatid pairs are split into two chromosomes by the contraction of spindle fibres which pulls the centromere apart.
- Each sister chromatids is now called a chromosome.
- The chromosome pairs then travel to poles of the CELL.



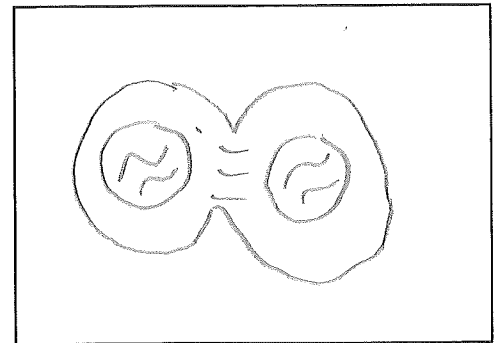
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T. telophase

- One complete set of chromosomes is now at each pole of the cell.
- The spindle fibres disappear
- A nuclear membrane reforms around each set of chromosomes

- The nucleolus reappears
- Now there are two nuclei in one cell with identical DNA
- the cell is ready for cytokinesis (division of the cell cytoplasm)

Sketch Stage:



Do This: *Mitosis Worksheets;*