

# BIOLOGY IN CONTEXT

## for Cambridge International AS & A Level

Second edition

### Authors

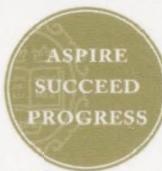
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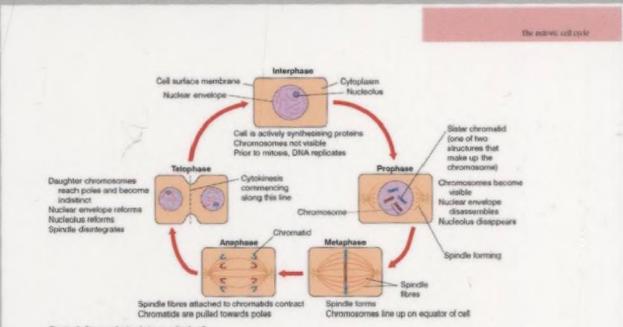
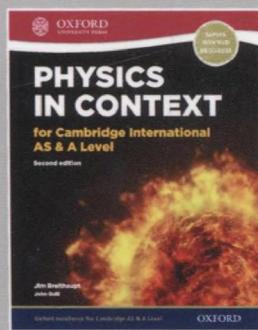
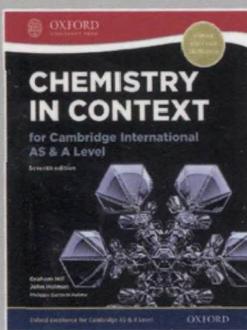


Figure 2 Stages of mitosis in an animal cell

#### Differences between mitosis in plant and animal cells

Centrioles are found in the cells of animals and some lower plants. However, they are absent from the cells of higher plants, although they still form spindles. Mitosis can still occur in animal cells that have had the centrioles removed, but not always with successful results.

In animal cells, cytokinesis occurs by the constriction of the centre of the parent cell from the outside inwards (see the telophase stage in Figure 2). In plant cells, division occurs by the growth of a cell plate across the equator of the parent cell, from the centre outwards. Cellulose is laid down on this plate to form the cell wall.

In plants, mitosis occurs in a specialised tissue known as meristematic tissue. Plant meristems occur in the growing regions, for example in root and shoot tips and in the cambium of stems and roots (Topic 7.3). In animals, stem cells are able to divide by mitosis. Stem cells occur where there is a requirement for growth, tissue repair and cell replacement (Topic 5.3).

**REMEMBER**  
The replication of DNA takes place during interphase before the nucleus and cell divide.

**THE PRACTICAL SKILLS SECTION ON THE ACCOMPANYING CD COVER TEMPORARILY REQUIRES PREPARATION AND DISCUSSES HOW TO MAKE HIGH-POWERED DRAWINGS OF CELLS IN STAGES OF MITOSIS.**

**EXTENSION**  
In animal cells, the pair of centrioles are replicated before the start of mitosis. The centriole in the area containing the centrioles is called the centriole and the other is called the centriole. During prophase, the centriole divides so that each centriole pair moves to the opposite poles of the cell and the centriole disappears. In plant cells that have the centrioles removed can still form a spindle, but not always with successful results. Plant cells do not have microtubules but do have microtubule organising centres (MOCs) that perform the same role as the centrioles containing the centrioles in animal cells.

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