

**AS 91156**  
**Demonstrate understanding of life processes at the cellular level**  
**Level 2 4 Credits**

This achievement standard involves demonstrating understanding of life processes at the cellular level.

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of life processes at the cellular level.	Demonstrate in-depth understanding of life processes at the cellular level.	Demonstrate comprehensive understanding of life processes at the cellular level.

*Demonstrate understanding* involves defining, using annotated diagrams or models to describe, and describing characteristics of, or providing an account of, life processes at the cellular level.

*Demonstrate in-depth understanding* involves using biological ideas to give reasons how or why life processes occur at the cellular level.

*Demonstrate comprehensive understanding* involves linking biological ideas about life processes at the cellular level. The discussion of ideas may involve justifying, relating, evaluating, comparing and contrasting, analysing.

Cells include plant cells and animal cells.

☐ Life processes at the cellular level include:

- photosynthesis
- respiration
- cell division
  - structure of DNA
  - DNA replication (and the meaning of semi-conservative replication)
  - mitosis
 as part of the cell cycle

☐ Biological ideas, as they relate to each of the life processes at the cellular level, are selected from:

- movement of materials, including
  - diffusion
  - osmosis
  - active transport
- enzyme activity (specific names of enzymes are not required)
- factors affecting the process, which may include
  - the direct availability of resources (e.g. sunlight, water, CO<sub>2</sub> are all needed for photosynthesis)
  - the indirect effect of factors that affect enzyme activity within cells (e.g. temperature, pH, substrate, concentration, co-enzymes, enzyme poisons)
- details of the processes only as they relate to the overall functioning of the cell (specific names of stages are not required)
- reasons for similarities and differences between cells such as
  - cell size and shape
  - type and number of organelles present

**Key words:** These are the words that you are expected to understand when used in questions and be able to use in your answers.

<input type="checkbox"/> Activation Energy	<input type="checkbox"/> Active Site	<input type="checkbox"/> Active transport
<input type="checkbox"/> Adenine	<input type="checkbox"/> ADP	<input type="checkbox"/> Aerobic
<input type="checkbox"/> Alcohol	<input type="checkbox"/> Amoeba	<input type="checkbox"/> Anaerobic
<input type="checkbox"/> Anti-parallel	<input type="checkbox"/> Catalyst	<input type="checkbox"/> Cell membrane
<input type="checkbox"/> ATP	<input type="checkbox"/> Cellulose	<input type="checkbox"/> Cellular respiration
<input type="checkbox"/> Cell wall	<input type="checkbox"/> Chloroplast	<input type="checkbox"/> Cilia
<input type="checkbox"/> Centriole	<input type="checkbox"/> Co-factor	<input type="checkbox"/> Cristae
<input type="checkbox"/> Co-enzyme	<input type="checkbox"/> Cytosine	<input type="checkbox"/> Concentration gradient
<input type="checkbox"/> Cytoplasm	<input type="checkbox"/> DNA ligase	<input type="checkbox"/> Diffusion
<input type="checkbox"/> DNA polymerase III	<input type="checkbox"/> Denatured	<input type="checkbox"/> Endoplasmic reticulum
<input type="checkbox"/> DNA polymerase I	<input type="checkbox"/> Double helix	<input type="checkbox"/> Enzymes
<input type="checkbox"/> DNA	<input type="checkbox"/> DNA replication	<input type="checkbox"/> Glycolysis
<input type="checkbox"/> Fermentation	<input type="checkbox"/> Flaccid	<input type="checkbox"/> Guanine
<input type="checkbox"/> Golgi apparatus	<input type="checkbox"/> Grana	<input type="checkbox"/> Helicase
<input type="checkbox"/> Lactic acid	<input type="checkbox"/> Lamellae	<input type="checkbox"/> Induced fit model
<input type="checkbox"/> Matrix	<input type="checkbox"/> Lysosome	<input type="checkbox"/> Ion exchange pump
<input type="checkbox"/> Mitochondria	<input type="checkbox"/> Nuclear membrane	<input type="checkbox"/> Light dependent reaction
<input type="checkbox"/> Nucleotide	<input type="checkbox"/> Nucleolus	<input type="checkbox"/> Light independent reaction
<input type="checkbox"/> Leading strand	<input type="checkbox"/> Lagging strand	<input type="checkbox"/> Lock and key theory
<input type="checkbox"/> Osmoregulation	<input type="checkbox"/> Osmosis	<input type="checkbox"/> Organelles
<input type="checkbox"/> Okazaki fragments	<input type="checkbox"/> Phagocytosis	<input type="checkbox"/> Photosynthesis
<input type="checkbox"/> Passive transport	<input type="checkbox"/> Plasmolysis	<input type="checkbox"/> Pinocytosis
<input type="checkbox"/> Replication fork	<input type="checkbox"/> Secretion	<input type="checkbox"/> RNA primer
<input type="checkbox"/> Ribosome	<input type="checkbox"/> Substrate	<input type="checkbox"/> Semi-permeable membrane
<input type="checkbox"/> Stroma	<input type="checkbox"/> Turgor	<input type="checkbox"/> Surface area : volume ratio
<input type="checkbox"/> Thymine	<input type="checkbox"/> Vacuole	<input type="checkbox"/> Unicellular organism
<input type="checkbox"/> Uracil	<input type="checkbox"/> Vesicle	