



Biology - UK

YEARS 7 - 9

Experience Level: **KEY-STAGE 3**

Number of Classes: **VARIABLE**

Age Range: **11 - 14 YEARS**

Structure and function of living organisms

01 Cells and organisation

- Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope.
- The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts.
- The similarities and differences between plant and animal cells.
- The role of diffusion in the movement of materials in and between cells.

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02

01 Cells and organisation (Contd).

- The structural adaptations of some unicellular organisms.
- The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms.

02 The skeletal and muscular systems

- The structure and functions of the human skeleton, to include support, protection, movement and making blood cells.
- Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.
- The function of muscles and examples of antagonistic muscles.

03 Nutrition and digestion

- The content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed.
- Calculations of energy requirements in a healthy daily diet.
- The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases.
- The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts).
- The importance of bacteria in the human digestive system.

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03 Nutrition and digestion (Contd).

- Plants making carbohydrates in their leaves by photosynthesis and gaining mineral nutrients and water from the soil via their roots.

04 Gas exchange systems

- The structure and functions of the gas exchange system in humans, including adaptations to function.
- The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume.
- The impact of exercise, asthma and smoking on the human gas exchange system.
- The role of leaf stomata in gas exchange in plants.

05 Reproduction

- Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta.
- Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

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06 Health

- The effects of recreational drugs (including substance misuse) on behaviour, health and life processes.

Material cycles and energy

01 Photosynthesis

- The reactants in, and products of, photosynthesis, and a word summary for photosynthesis.
- The dependence of almost all life on Earth on the ability of photosynthetic organisms, such as plants and algae, to use sunlight in photosynthesis to build organic molecules that are an essential energy store and to maintain levels of oxygen and carbon dioxide in the atmosphere.
- The adaptations of leaves for photosynthesis.

02 Cellular respiration

- Aerobic and anaerobic respiration in living organisms, including the breakdown of organic molecules to enable all the other chemical processes necessary for life.
- A word summary for aerobic respiration.
- The process of anaerobic respiration in humans and micro-organisms, including fermentation, and a word summary for anaerobic respiration.
- The differences between aerobic and anaerobic respiration in terms of the reactants, the products formed and the implications for the organism.

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Interactions and interdependencies

01 Relationships in an ecosystem

- The interdependence of organisms in an ecosystem, including food webs and insect pollinated crops.
- Importance of plant reproduction through insect pollination in human food security.
- How organisms affect, and are affected by, their environment, including the accumulation of toxic materials.

Genetics and evolution

01 Inheritance, chromosomes, DNA and genes

- Heredity as the process by which genetic information is transmitted from one generation to the next.
- A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model.
- Differences between species.
- The variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation.
- The variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection.

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01 Inheritance, chromosomes, DNA and genes (Contd).

- The importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.

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