KS3 – Year 7

Organisms

What's the science story?

Organisms, living and dead, are made up of cells. Cells are made of molecules organised into membranes and other structures. Most cells are too small to be seen with the naked eye but can be seen using a light microscope. There are many different types of cells with different shapes and sizes, but all cells are made up of common parts: all cells have a genome and cytoplasm contained by a cell membrane; all animal and plant cells store their genome within a nucleus, and they also have mitochondria; plant cells additionally have a cell wall and can have chloroplasts and a vacuole. These parts have common functions in all cells.

A single cell can carry out all the processes of life. An organism may be made up of a single cell or many cells working together. This is why scientists think of cells as the basic units of life. To stay alive, cells need a constant supply of energy and molecules for chemical reactions, and they need to get rid of waste. Molecules move through the cytoplasm by diffusion, and some molecules can enter and leave a cell by diffusing through the cell membrane.

In a multicellular organism the cells are organised into tissues, organs and organ systems that work together to support the life processes of cells to keep the organism alive. Humans and other animals have a skeleton and muscles, which are types of tissue made up of cells. Bones provide support and protection for organs. Bones and muscles work together to enable humans to move around, and muscles have vital roles in organs and organ systems.

Previous knowledge:

KS2 – Yr 5/6

Living things and habitats

Animals, including humans

Next steps…

KS3

Yr8 - Body systems

Yr9 - Photosynthesis & Respiration

KS4

Yr 10 - B1 Cell Biology

Yr 10 - B2 Organisation

Keywords

Cell	Chloroplast	Diffusion	Gametes
Organism	Vacuole	Unicellular	Gestation
Nucleus	Tissue	Multicellular	Pregnancy
Cytoplasm	Organ	Hierarchy	Pollination
Cell membrane	Organ system	Antagonist	Dispersal
Mitochondria	Magnification	Menstrual cycle	Ecosystem
Cell wall	Specialised	Fertilisation	Interdependence

Working scientifically skills:

WS8 – Reading and using a given method

WS10 – Selecting the correct equipment

WS11 – Hazards

General skills:

Reading a given method and other text

Vocabulary – introducing new keywords

Discussions – paired and group

Assessments:

Exit tickets x 2/3 (formative)

L1 – The microscope - method

L3 – Animal and plant cell – justify/reasoning

L5 – Diffusion – decribe what is happening

L11 – Fertilisation – specialised cell; sperm

L15 – Food webs – predicting what would happen if an organism was removed

Key SATs style Qs (EQ)

Parts of cells

Joints

Muscles AGD

Sperm and egg

Fertilsaition and birth

Parts of a plant

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Lesson No. and Title	Learning objectives	National Curriculum	Practical equipment
1. Observing cells ***Possible exit ticket - microscopes***	ARE – To explain how to use a microscope and state the magnification. AGD – To calculate a range of magnifications.	• cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope	**PRAC—Observe prepared slides under microscope** Microscopes and prepared slides **WS8** – Reading and using a given method **WS10** – Selecting the correct equipment
2. Cells	ARE – To correctly draw and label a plant and animal cell. AGD – To explain the functions of the components of animal and plant cells.	• the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts	
3. Plant and animal cells ***Possible exit ticket – Animal and plant cells***	ARE – To compare animal and plant cells. AGD – To decide whether a cell is an animal or plant cell using evidence.	• the similarities and differences between plant and animal cells	**PRAC—Preparing own onion skin cell slide and cheek cells** Onion, slides, cover slips, microscopes, stain, tweezers, pointers, cotton buds **WS11** - Hazards
4. Specialised cells	ARE – To describe the structural adaptations of cells. AGD – To link the structure to the function of specialised cells.	• the functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts • the similarities and differences between plant and animal cells	
5. Diffusion ***Possible exit ticket - Diffusion***	ARE – To describe the process of diffusion. AGD – To apply diffusion to a range of examples in cells.	• the role of diffusion in the movement of materials in and between cells	**PRAC—Investigating diffusion using water and food colouring** Petri dishes, food colouring, pipettes, stop watches, 250ml beakers, kettles **WS11** - Hazards

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6. Unicellular organisms	ARE – To describe the structure of an amoeba and euglena. AGD – To explain what a unicellular organism is and give detailed examples.	• the structural adaptations of some unicellular organisms	**PRAC—Observing unicellular organisms under the microscope** Microscopes and prepared slides **WS8** – Reading and using a given method
7. Levels of organisation	ARE – To explain the hierarchy of organisation in a multicellular organism. AGD – To interpret information to explain the functions of organ systems.	• the hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms	
8. The skeletal system	ARE – To describe the functions of the muscular skeletal system. AGD – To explain the relationship between bones and joints in the skeleton.	• 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	**PRAC—Dissection of chicken wing** Chicken wings, scalpels, scissors, tiles, disinfectant, bin bag **WS11** - Hazards
9. The muscular system	ARE – To observe how muscles work together in a chicken wing. AGD – To explain how muscles interact with tissues to cause movement.	• the function of muscles and examples of antagonistic muscles	
10. The reproductive system	ARE – Describe the functions of the main structures of the male and female reproductive system. AGD – Link adaptations of structures to function.	• reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems	
11. Fertilisation ***Possible exit ticket – Fertilisation (link to specialised sperm cell)***	ARE – To describe the process of fertilisation and implantation. AGD – To discuss some possible causes of infertility.	• naming the gametes of both male and female and the process of fertilisation	

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12. Menstrual cycle	ARE – Identify key events in the menstrual cycle. AGD – Present information in a scaled timeline or pie chart.	• menstrual cycle (without details of hormones)	
13. Gestation and birth	ARE – To describe what happens during pregnancy. AGD – To compare the gestation periods of a range of organism.	• gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta	
14. Plant reproduction	ARE – To explain how plants reproduce. AGD – To justify the importance of plant reproduction through insect pollination.	• reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms • the importance of plant reproduction through insect pollination in human food security	**PRAC: Seed dispersal by Wind** Some fruit with seeds, metre ruler, masking tape, electric fans **PRAC: Flower dissection** Range of flowers (rose, lilly), white tiles, scalpels, tweezers **WS11** - Hazards
15. Interdependence ***Possible exit ticket – Food webs***	ARE – To construct a food web. AGD – To explain the importance of all the organisms in an ecosystem.	• the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops	
16. Our environment	ARE – To explain how organisms can affect their environment. AGD – To explain the process of bioaccumulation and the problems it can case.	• how organisms affect, and are affected by, their environment, including the accumulation of toxic materials	