

The Cell

Teaching Notes and Answer Keys

Subject area: Science / Biology

Topic focus: The Cell: components, types of cells, organelles, levels of organization

Learning Aims:

- describe similarities and differences between animal and plant cells
- differentiate between prokaryotic and eukaryotic cells
- describe the functions performed by cell structures
- understand the levels of organization of living systems

Skills:

Reading: scanning for specific information, decoding information, interpreting and classifying

Writing: describing from visuals (flow chart)

Speaking: making hypotheses and describing information in a visual

The basic building blocks of life, p. 10

- 1 Lead in: ask students to name one *living thing* and one *non-living thing*. Write all their contributions on the board (*Living: man, plants, fish, etc. – Non-living: building, stone, car, etc.*). Have students reflect on the list of organisms and think about all the features that make organisms *alive*. Have them brainstorm answers to these questions:

What are some characteristics of living things? What are some characteristics of non-living things? What makes living things different from non-living things? (Living things have a variety of characteristics that are displayed to different degrees: they breathe, move, respond to stimuli, reproduce and grow, and are dependent on their environment. Here are the seven criteria to define a living organism: *Feeding, Movement, Breathing or Respiration, Excretion, Growth, Sensitivity, Reproduction.*)

- 2 Introduce the basic differences between *plant cells* and *animal cells*. (*Plant cells* have cell walls, chloroplasts containing chlorophyll, other plastids that help store food, and a large vacuole. *Animal cells* have no cell walls and their shape is less regular.) Point out the common and different components in the drawing.

1 1 bricks; 2 cells;

2 **Features in common:** Have a nucleus, have a cell membrane, have a cytoplasm; **Differences:** *Animal cells* do not have a cell wall; do not have chloroplasts, do not have a large vacuole. *Plant cells* have a cell wall made of cellulose; have chloroplasts; have a vacuole filled with cell sap.

Inside the cell, p. 11

TR 1 - CLIL_Cell_3

- 3 Carry out a brainstorming activity. Write *Life kingdoms* on the board and elicit words connected to this topic. Organise the words in a spidergram (*animal, vegetable, microbe, etc.*). Students read the text in exercise 3. Offer explanations for any unknown vocabulary. After finding key words in the text, have students organise them in a spidergram.

3 1 Bacteria, 2 Protocista, 3 Fungi, 4 Animal cells, 5 Plant cells;

Animal cell Organelles, pp. 12-13

TR 2 - CLIL_Cell_4

- 4 Ask students to look closely at the picture of the cell and make hypotheses on the functions of the structures. (*E.g. mitochondria give energy to the cell.*)
- 5 Students to do this exercise in pairs. Check their answers in class.

5 1 C, 2 G, 3 H, 4 A, 5 B, 6 E, 7 F, 8 I, 9 D;

Extension

Have students compare a job in a factory to what happens in the cell: what the shipping department, the CEO, the factory floor, the assembly line, the workers, the finishing department, the maintenance crew and the power plant correspond to in the cell (e.g. the workers in the assembly line are like the ribosomes that build proteins, etc.)

Levels of Organization, p. 13

- 6 Help students describe the flow chart on page 13 orally, using the captions. Give them useful language to describe the process.

6 Possible answer

Cells are the first level of organization. Cells that are similar in structure and function usually join together to form tissues, which are the second level of organization. Tissues are further organized in organs, the third level of organization. Different organs work together to make up a specific system and this is the fourth level of organization. Each level of organization (cells, tissues, organs, and systems) interacts with every other level to make an organism, the fifth level. The organism is a member of a group of one species: the population. Different populations living in the same habitat are called a community who, together with non-living parts, make up an ecosystem.

Check your Knowledge, p. 14

The multiple choice assessment (test A) is focused on recognition of subject-specific vocabulary, while the crossword activity (test B) provides a more challenging production based task.

A 1 C, 2 A, 3 B, 4 A, 5 B, 6 C, 7 A, 8 B, 9 C, 10 C;
B 1 Cell membrane, 2 Mitochondrion, 3 Lysosomes, 4 Nucleus, 5 Ribosomes, 6 Golgi apparatus

The basic building blocks of life

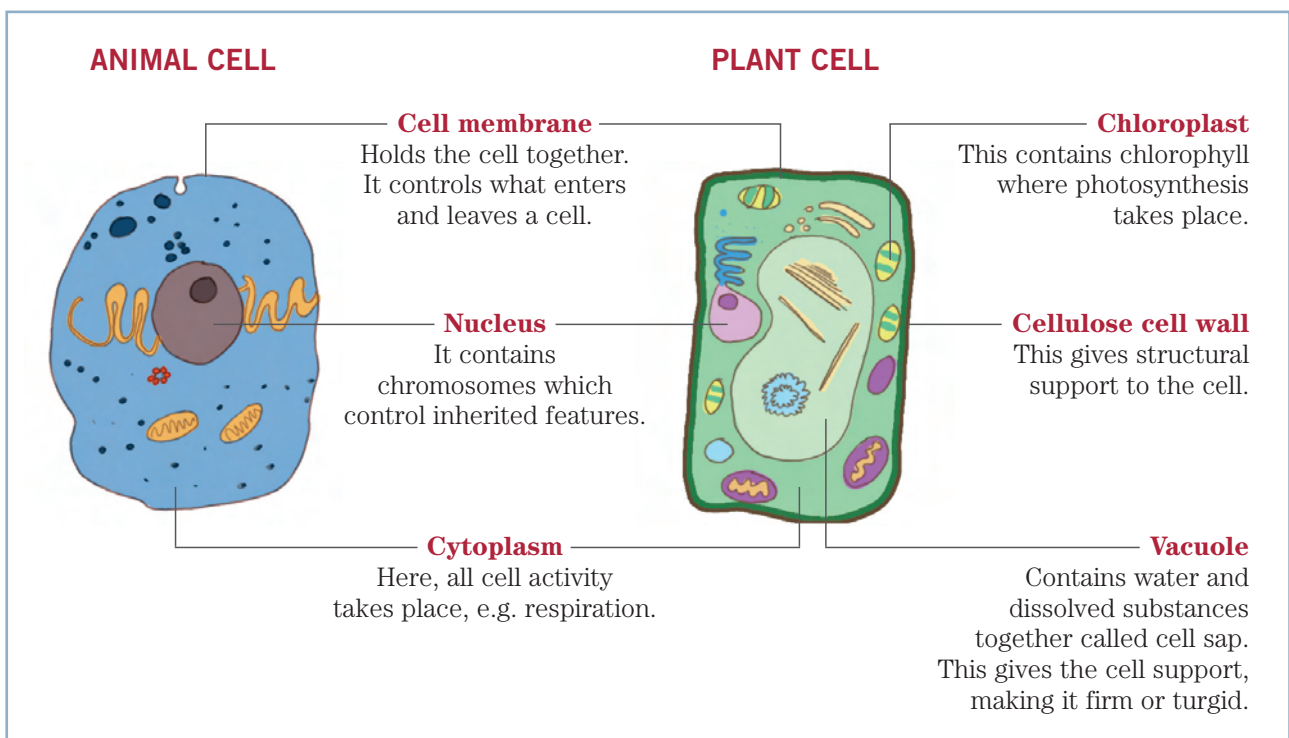
1 Read and complete.

Both the house and the human body are built up of smaller blocks. What do you call the building blocks that make up the

- 1 house? _____
- 2 human body? _____



2 Animal and plant cells share many features but there are differences, too. Look at the picture and fill in the table below.



	Animal cells	Plant cells
Features in common	<i>Have</i> _____ _____ _____	_____ _____ _____
Differences	<i>Do not have</i> _____ _____ _____	_____ _____ _____

Inside the Cell

- 3  **TR 1 - CLIL_Cell_3** Read and match the types of cell in the box with their correct description. Underline the key words / sentences that help you carry out the matching. Then listen and check.

Bacteria Animal cells Fungi Protocista Plant cells

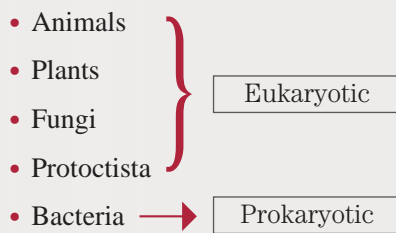
The cell is the basic unit of life. It is the smallest entity that can exist as an independent living system. The proper functioning of your body depends on what happens within your many different types of cells. Obviously, there are major differences between types of cells. Muscle cells, which can contract, have to be quite different from bone cells. Plant cells have a unique ability to use light as a source of energy.

Biologists make a distinction between cells based on how they are organized:

- *Eukaryotic cells* (from the Greek meaning ‘truly nuclear’) are complex and highly structured, with a nucleus and internal membrane-bound structures called ‘organelles’. They include all of the life kingdoms except bacteria.
- *Prokaryotic cells* (from the Greek meaning ‘before the nucleus’) are less structured, and do not have a nucleus or membrane-bound organelles. They include unicellular microorganisms like bacteria.

Types of cells

We can classify all living organisms according to five kingdoms:

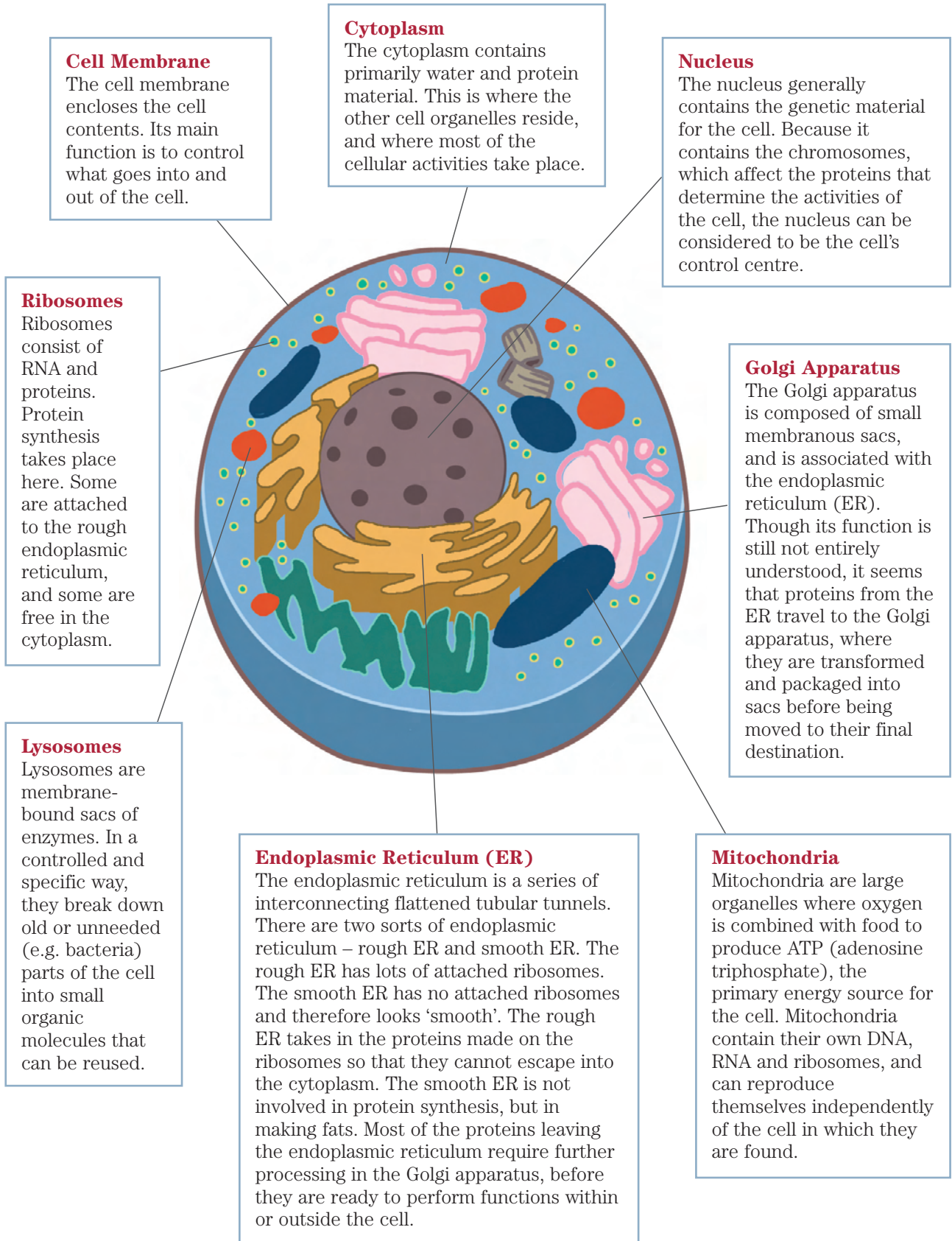


- _____ are the most numerous organisms on Earth. Billions of them may be found in a handful of mud, or in your mouth! They are single self-contained, living cells. They have no nuclear membrane, and so their genetic material is contained in a single circular molecule of DNA in the ‘nucleoid’ area.
- _____ is the catch-all category for organisms that do not quite fit into the other kingdoms. They are one-celled or multi-celled eukaryotes, with a nuclear membrane. Some of them, like amoeba, look like typical animal cells, but they are single-celled organisms. Others, like euglena, have features of both animal and plant cells.
- _____ must absorb their food molecules directly from other living or non-living organic sources. They usually have branching multicellular threads called hyphae that develop from spores.
- _____ have a nucleus, mitochondria, endoplasmic reticulum, ribosomes, Golgi apparatus and lysosomes. Unlike plant cells, they do not have chloroplasts, a cell wall nor a vacuole. They are surrounded only by a membrane, which allows the cell to be flexible and yielding.
- _____ have a nucleus, mitochondria, endoplasmic reticulum, ribosomes, Golgi apparatus and lysosomes, like animal cells. However, this type of cell is surrounded by a cell wall made of cellulose, which makes the cell more rigid.

Animal Cell Organelles

4 **TR 2 - CLIL_Cell_4** Read and listen to the following information.

Cell organelles are the structures within a cell. They are a bit like the organs in a human body. They each have a specific role to play and have a distinctive shape and size.



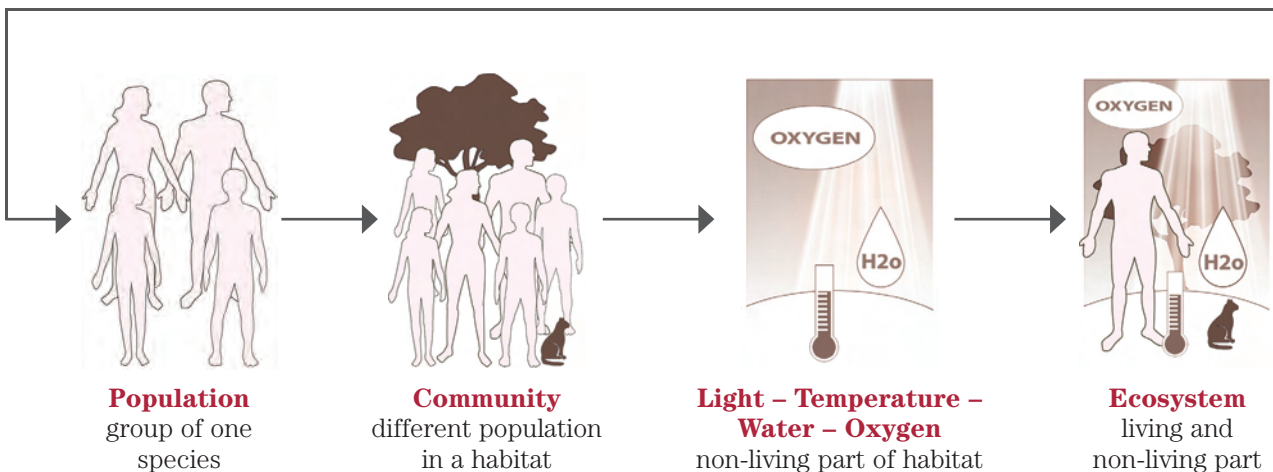
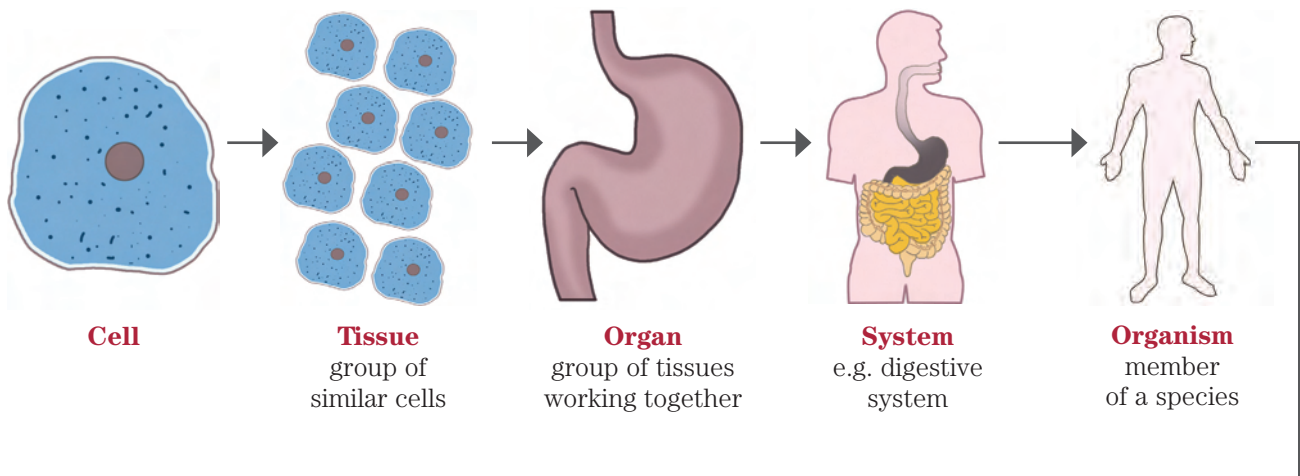
5 Read the information on pages 10 and 12 again. Then match the structure with its description in the table below.

Structure	Description
1 <input type="checkbox"/> Cell membrane	A Producing energy source.
2 <input type="checkbox"/> Cytoplasm	B Making proteins from amino acids.
3 <input type="checkbox"/> Nucleus	C Controlling what enters and leaves the cell.
4 <input type="checkbox"/> Mitochondrion	D Modifying, enclosing and dispatching proteins.
5 <input type="checkbox"/> Ribosomes	E Breaking down and recycling worn out organelles.
6 <input type="checkbox"/> Lysosomes	F Making, storing and transporting proteins.
7 <input type="checkbox"/> Rough Endoplasmic Reticulum (RER)	G Surrounding the nucleus.
8 <input type="checkbox"/> Smooth Endoplasmic Reticulum (SER)	H Contains the chromosomes.
9 <input type="checkbox"/> Golgi Apparatus	I Making and transporting fats.

Level of Organization – From simple to complex

6 Use the information in the illustrated flow chart and write a paragraph about the levels of organization of cells.

Start like this: *Cells are the first level of organization.*



Check your knowledge

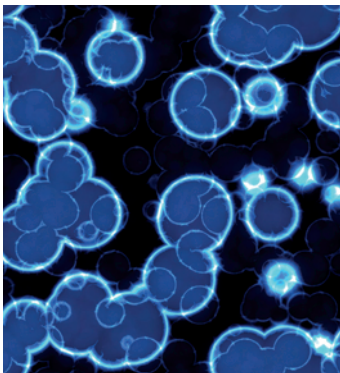
A The Cell Test

Read and choose the correct answer A, B or C.

- 1 The cell is partially made up of
 - A tissues
 - B systems
 - C organelles
- 2 The control centre of the cell is the
 - A nucleus
 - B cytoplasm
 - C mitochondrium
- 3 The outer covering of an animal cell is the
 - A cell wall
 - B cell membrane
 - C nucleus
- 4 Cells similar in structure and function joining together form
 - A tissues
 - B systems
 - C organisms
- 5 A sac in the cytoplasm storing water, food and other materials is a
 - A chromosome
 - B vacuole
 - C chloroplast
- 6 Proteins are transported from the nuclear membrane to other parts of the cell through
 - A ribosomes
 - B vacuoles
 - C endoplasmic reticulum
- 7 The microscopic unit of structure and function in an organism is a/an
 - A cell
 - B organelle
 - C tissue
- 8 A structure involved in regulating the movement of materials into the cell is the
 - A ribosome
 - B Golgi apparatus
 - C cell membrane
- 9 Within a cell, RNA is mainly found in the
 - A cell wall
 - B plasma membrane
 - C ribosomes
- 10 Food and other materials leave and enter the cell through openings in the
 - A nucleus
 - B ribosomes
 - C cell membrane

B Crossword

Read the definitions and complete the crossword.



- 1 The boundary between the cell and its external environment.
- 2 It is the cell's energy source.
- 3 They recycle old unneeded parts of the cell.
- 4 The control centre of a cell.
- 5 Organelles where proteins are made.
- 6 It packages and ships proteins.

