1 The nature and variety of living organisms

Edexcel IGCSE Biology (Higher) - Question and answer notes

How to use these notes

For each question and answer:

- Read it carefully and make sure you **understand** it
- **Memorise** the answer
- **Practice** applying your understanding to past exam questions

You can memorise the answers by using **retrieval practice** - which is when you practise retrieving information from your memory. This can be done using flashcards or a flashcard app, by asking someone to quiz you, or by covering up the answers with a piece of paper and testing yourself. Past paper practice can also be a form of retrieval practice.

1a Characteristics of living organisms

What eight characteristics do all living organisms share?

- They control their **i**nternal conditions
- They **m**ove
- They **r**espire
- They respond to their **s**urroundings
- They require **n**utrition
- They **e**xcrete their waste
- They **r**eproduce
- They **g**row and develop

MEMORY AID: You can remember the eight characteristics above using this mnemonic:

I MRS NERG

1b Variety of living organisms

What are the two categories of living organisms?

- Prokaryotic organisms
- Eukaryotic organisms

Name one group of prokaryotic organisms.
Bacteria

Name four groups of eukaryotic organisms.

- Plants
- Animals
- Fungi
- Protoctists

What is the term for organisms made up of only one cell?
Single-celled organisms (or unicellular organisms)

What is the term of organisms made up of multiple cells?
Multicellular organisms

PLANTS

What are the common features of plants?

- All plants are multicellular
- Plants have chloroplasts in some of their cells, which enables them to carry out photosynthesis
- Plant cells have cell walls made of cellulose
- Plants store carbohydrates as starch or sucrose

What are two types of flowering plants? Give examples of each

- Cereals. For example, maize.
- Herbaceous legumes. For example, peas and beans.

ANIMALS

What are the common features of animals?

- All animals are multicellular
- Animal cells do not contain chloroplasts and animals cannot carry out photosynthesis

- Animal cells do not have cell walls
- Animals usually have a nervous system
- Animals are usually able to move from one place to another
- Animals often store carbohydrate as glycogen

What are two types of animals? Give example of each

- Mammals. For example, humans.
- Insects. For example, houseflies and mosquitos.

FUNGI

What are the common features of fungi?

- Some fungi are single-celled and some are multicellular
- Fungi cells have cell walls made of chitin
- Some fungi store carbohydrate as glycogen

What is the name of the process by which fungi obtain food?
Saprotrophic nutrition

What happens in saprotrophic nutrition?

- The fungi secrete digestive enzymes onto food material (such as dead plants or animals).
- The digestive enzymes then break down the food.
- The fungi then absorb the products of the digestion.

What is the term for enzymes that work outside of cells, such as the digestive enzymes secreted by fungi?
Extracellular enzymes.

What is the typical structure of a multicellular fungus?

- A multicellular fungus typically has a structure called a mycelium.
- A mycelium is made up of many branching, thread-like structures called hyphae.
- The hyphae each contain many nuclei.

Give an example of a multicellular fungus that has a mycelium.
Mucor

Give an example of a single-celled fungus
Yeast

PROTOCTISTS

What are the common features of protoctists?

- Protoctists are single-celled
- Protoctists are microscopic (so small that they can only be seen with a microscope)
- Some protoctists have features similar to animals cells, while others have features similar to plant cells

Give an example of a protoctist that has features like an animal cell
Amoeba

Where do amoebas live?
In pond water

Give an example of a protoctist that has features like a plant cell
Chlorella

What is one feature that *Chlorella* has that makes it similar to a plant cell?
Chloroplasts

What is one example of a protoctist that is a pathogen? What disease does it cause?
Plasmodium, which causes malaria

[Note: the definition of pathogen is given below]

BACTERIA

What are the common features of bacteria?

- Bacteria are single-celled
- Bacteria are microscopic
- Bacterial cells have the following structures:
    - A cell wall
    - A cell membrane
    - Cytoplasm
    - A circular chromosome of DNA

    - Small loops of DNA called plasmids
- Bacterial cells do not contain a nucleus
- Some bacteria carry out photosynthesis (but they do not have chloroplasts)
- Most bacteria feed off other living or dead organisms

Give two examples of bacteria. Give a short description of each.

- *Lactobacillus bulgaricus* - A rod-shaped bacterium used in the production of yoghurt from milk
- *Pneumococcus* - A spherical bacterium that is a human pathogen. It causes pneumonia.

VIRUSES

What are viruses?

- Viruses are small particles that are not alive.
- They are parasitic and can only reproduce inside living cells.
- There are viruses that infect every type of living organism.

What is the typical structure of virus

- Most viruses are much smaller than bacteria.
- They are made up of DNA or RNA surrounded by a protein coat.
- They come in a variety of shapes and sizes.
- They do not have cells.

PATHOGENS

What is a pathogen?
A living organism that causes disease.

What types of organisms can be pathogens?

- Fungi
- Bacteria
- Protoctists
- Viruses

Name five pathogens. State what type of organism each one is, what type of organism it infects, and what disease it causes.

[Note: some of this information is repeated from above]

Name of pathogen	Type of pathogen	Organism infected	Disease caused
Plasmodium	Protoctist	Humans	Malaria
Pneumococcus	Bacterium	Humans	Pneumonia
Tobacco mosaic virus	Virus	Tobacco plants	- see below -
Influenza virus	Virus	Humans	Influenza (flu)
HIV	Virus	Humans	AIDS

How does tobacco mosaic virus affect tobacco plants that infects?

- When tobacco mosaic virus infects a tobacco plant, it prevents the plant from forming chloroplasts.
- This causes discoloration of the leaves (the leaves turn yellow).
- By preventing the formation of new chloroplasts, the virus limits the plant's ability to photosynthesise, which stunts the plant's growth.