



# 1 The nature and variety of living organisms

1.1 understand how living organisms share the following characteristics:

- they require nutrition
- they respire
- they excrete their waste
- they respond to their surroundings
- they move
- they control their internal conditions
- they reproduce
- they grow and develop.

	<p>5 = 4 4 = 3 3 or 2 = 2 1 = 1</p>	4
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1.2 describe the common features shown by eukaryotic organisms: plants, animals, fungi and protocists

Group	Fe re					
	Cell wall	Plasmid	Cytoplasm	Nucleus		
bacteria	✓	✓	(✓)	✗	one mark for each correct column hybrid cross tick = 0 empty box = 0	4
fungi	✓;	✗;	✓	(✓)		
protocists	(✗)	✗)	✓;	✓;		
virus / eq;					allow named virus allow prion allow nematodes allow helminths	1
malaria / dysentery / sleeping sickness / giardiasis / toxoplasmosis / eq;						1



(b)	Group	Example from the group	Molecule used to store carbohydrate	Ignore in plants sugar / glucose / fructose  Allow <b>Fomes formentarius / eq</b>	4
	animals		glycogen;		
	plants	(maize)	starch / sucrose;		
	fungi	mucor / yeast / mushroom / mould / eq;	glycogen;		

10	<ol style="list-style-type: none"> <li>1. cellulose;</li> <li>2. starch;</li> <li>3. consumers;</li> <li>4. glycogen;</li> <li>5. chromosome / nucleiod;</li> <li>6. plasmids / plasmid;</li> <li>7. photosynthesis / photosynthesising;</li> <li>8. yoghurt / cheese;</li> <li>9. pathogen;</li> <li>10. pneumonia;</li> </ol>	Mp 5 must be singular not chromosomes	10
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1.2 Plants: these are multicellular organisms; their cells contain chloroplasts and are able to carry out photosynthesis; their cells have cellulose cell walls; they store carbohydrates as starch or sucrose. Examples include flowering plants, such as a cereal (for example, maize), and a herbaceous legume (for example, peas or beans).

8 (a)	<b>Feature</b>		<b>Animals</b>	4 marks all correct 3 marks for 6 or 7 2 marks for 4 or 5 1 marks for 2 or 3 0 marks for 0 or 1  blank squares = wrong  tick cross combined = wrong	4
	can move from place to place	(X)	(√)		
	can carry out photosynthesis	√	X;		
	are multicellular	√	√;		
	have cells with cell walls	√	X;		
store carbohydrate as glycogen	X	√;			
(b)	fungi; bacteria / prokaryotes; protocists / protozoa; viruses;			allow singular or plural ignore parasites / microorganisms / specific names eg cholera / amoeba	Max 2



1.2 Animals: these are multicellular organisms; their cells do not contain chloroplasts and are not able to carry out photosynthesis; they have no cell walls; they usually have nervous co-ordination and are able to move from one place to another; they often store carbohydrate as glycogen. Examples include mammals (for example, humans) and insects (for example, housefly and mosquito).

Characteristic	Example of this process		
they require nutrition	eating food		4
they respire	releasing energy from carbohydrate		
<b>movement / eq;</b>	some animals can fly		
they control their internal conditions	<b>blood glucose / blood pressure / body temperature / sweating / osmoregulation / eq;</b>		
<b>reproduce / eq;</b>	increase of the population of foxes		
they grow	<b>cells divide / increase in mass / size / get bigger / increase in height / eq;</b>		

1.2 Fungi: these are organisms that are not able to carry out photosynthesis; their body is usually organised into a mycelium made from thread-like structures called hyphae, which contain many nuclei; some examples are single-celled; their cells have walls made of chitin; they feed by extracellular secretion of digestive enzymes onto food material and absorption of the organic products; this is known as saprotrophic nutrition; they may store carbohydrate as glycogen. Examples include *Mucor*, which has the typical fungal hyphal structure, and yeast, which is single-celled.

E;			2
C;			
1. can be used in the production of beer;	3 ticks max 1		
2. cell wall is made of chitin;	4 ticks or more = 0		2

11 (a) (i)	glycogen;		1
(ii)	hyphae / hypha;		1

11 (a)	1. hyphae / mycelium; 2. enzymes; 3. extracellular / onto wood / outside organism / eq; 4. digest / digestive / breakdown; 5. carbon dioxide / water; 6. saprotroph / saprophyte / saprobiont / eq;	3. Ignore secrete alone 4. Ignore decay	max 4
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1.2 Protocists: these are microscopic single-celled organisms. Some, like *Amoeba*, that live in pond water, have features like an animal cell, while others, like *Chlorella*, have chloroplasts and are more like plants. A pathogenic example is *Plasmodium*, responsible for causing malaria.

9 (a)	<table border="1"> <thead> <tr> <th rowspan="2">Group</th> <th colspan="4">Feature</th> </tr> <tr> <th>Cell wall</th> <th>Plasmid</th> <th>Cytoplasm</th> <th>Nucleus</th> </tr> </thead> <tbody> <tr> <td>bacteria</td> <td>✓</td> <td>✓</td> <td>(✓)</td> <td>*</td> </tr> <tr> <td>fungi</td> <td>✓;</td> <td>*;</td> <td>✓</td> <td>(✓)</td> </tr> <tr> <td>protocists</td> <td>(*)</td> <td>(*)</td> <td>✓;</td> <td>✓;</td> </tr> </tbody> </table>				Group	Feature				Cell wall	Plasmid	Cytoplasm	Nucleus	bacteria	✓	✓	(✓)	*	fungi	✓;	*;	✓	(✓)	protocists	(*)	(*)	✓;	✓;	one mark for each correct column hybrid cross tick = 0 empty box = 0	4
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1.3 describe the common features shown by prokaryotic organisms such as bacteria  
 Bacteria: these are microscopic single-celled organisms; they have a cell wall, cell membrane, cytoplasm and plasmids; they lack a nucleus but contain a circular chromosome of DNA; some bacteria can carry out photosynthesis but most feed off other living or dead organisms. Examples include *Lactobacillus bulgaricus*, a rod-shaped bacterium used in the production of yoghurt from milk, and *Pneumococcus*, a spherical bacterium that acts as the pathogen causing pneumonia.

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1 (a)	1. cell membrane; 2. cytoplasm; 3. chromosome / nucleoid; 4. plasmid(s); 5. flagellum; 6. cilia; 7. ribosome; 8. capsule;	3. ignore DNA 4. ignore circle of DNA  ignore incorrect structure label  ignore correct structure labelled incorrectly or doesn't look like correct structure eg plasmid going to a straight line in cytoplasm	3
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1 (a)	cell membrane; cytoplasm; plasmid; nucleoid / chromosome / DNA once;	reject nucleus / nucleolus ignore vacuole / ribosomes / mitochondria	3
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1.4 understand the term pathogen and know that pathogens may include fungi, bacteria, protoctists or viruses

Viruses: these are not living organisms. They are small particles, smaller than bacteria; they are parasitic and can reproduce only inside living cells; they infect every type of living organism. They have a wide variety of shapes and sizes; they have no cellular structure but have a protein coat and contain one type of nucleic acid, either DNA or RNA. Examples include the tobacco mosaic virus that causes discolouring of the leaves of tobacco plants by preventing the formation of chloroplasts, the influenza virus that causes 'flu' and the HIV virus that causes AIDS.

(a) (i)	1. cannot reproduce without host; 2. do not move; 3. do not respire; 4. not respond to stimuli; 5. not grow / develop; 6. not excrete; 7. not feed; 8. do not control internal conditions;		2
(ii)	1. HI / AIDS; 2. TMV / tobacco mosaic disease; 3. influenza / flu / cold / Ebola / eq;	allow any named virus or disease caused by virus	1
(b)	1. not genetic material / DNA / RNA; 2. not recognised by immune system / eq; 3. small; 4. always fatal; 5. viruses have protein coat; 6. viruses can be used as vectors;	allow converse	2



3	(a)	(i)	Lactobacillus;	Allow approx. spelling	1
		(ii)	Mucor;		1
		(iii)	bean;		1
		(iv)	mosquito;		1
	(b)	(i)	only reproduce in living cells / eq; protein coat; only DNA / only RNA / one type of nucleic acid / eq;  smaller; no organelles; no cytoplasm; no mitochondria;  do not move; do not respire; do not feed; no sensitivity; do not grow; do not excrete / produce waste;	ignore cell wall / cell membrane / chloroplast / nucleus / nucleoid / multicellular	max 3
		(ii)	HIV / eq; human / eq; AIDS / effects immune system / eq;	if named disease wrong still allow effect ignore organs	3
4	(a)		1. do not respire; 2. cannot reproduce without (host) cell / reproduce in (host) cell / can only reproduce within an organism; 3. do not move; 4. do not sense; 5. do not excrete; 6. do not grow; 7. do not feed / do not need nutrition; 8. do not control their internal conditions; 9. are not cellular;		2 max
	b)		HIV / TMV / influenza / Ebola / herpes / swine flu / bird flu / H15;	Allow named virus disease Ignore AIDS	1
			1. bacteria are bigger / viruses are smaller; 2. cell membrane in bacterium; 3. cell wall in bacteria / protein coat/capsid in virus / envelope in virus; 4. flagellum in bacteria / eq; 5. bacteria have plasmids / nucleoid; 6. bacteria have cytoplasm;	Ignore cellular structure alone Ignore nucleus / shape	1 max
3			nucleic; RNA / ribose nucleic acid; HIV / (human) immuno deficiency; immune; white / leukocyte / lymphocyte / eq; antibodies / antitoxins; vaccination / vaccine / inoculation / immunisation / eq;	ignore phagocytes	Max 7