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Cambridge IGCSE® & O Level Complete Biology Workbook

Fourth Edition

Sample student material

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1. The seven characteristics of living organisms are **respiration, growth, sensitivity, nutrition, excretion, movement, and reproduction**.

Complete this table by choosing words from this list and writing them opposite their correct meanings.

	Meaning	Characteristic
A	The ability to detect stimuli and make appropriate responses	
B	A set of processes that makes more of the same kind of organism	
C	Removal from an organism of toxic materials, the waste products of metabolism, or substances in excess of requirements	
D	A set of chemical reactions that breaks down nutrients to release energy in living cells	

[4]

2. To biologists, classification means:

- A giving organisms a name B identifying organisms
C putting organisms into groups D describing organisms

Underline your answer.

[1]

3. The following is a list of groups that biologists use to classify living organisms.

class family genus kingdom order phylum species

Rewrite the list in the correct hierarchy of classification.

[3]

Extension

4. Write out the complete hierarchical classification for a human.
5. Scientists in South Africa have recently discovered remains of an organism they have named *Homo naledi*. Suggest what this name tells you about the relationship of this organism to a modern day human.

1. The drawings show four common birds that came to feed in an English garden.



Parus caeruleus



Parus major



Turdus merula



Erithacus rubecula

a. State which two birds scientists believe are most closely related and explain your answer.

.....

..... [2]

b. i. Complete this table showing the external features of these birds. One example column has been completed.

Species/feature	All feathers the same colour	Dark stripe along length of body	Large pale areas on sides of head
<i>Erithacus rubecula</i>	X		
<i>Parus caeruleus</i>	X		
<i>Parus major</i>	X		
<i>Turdus merula</i>	✓		

[3]

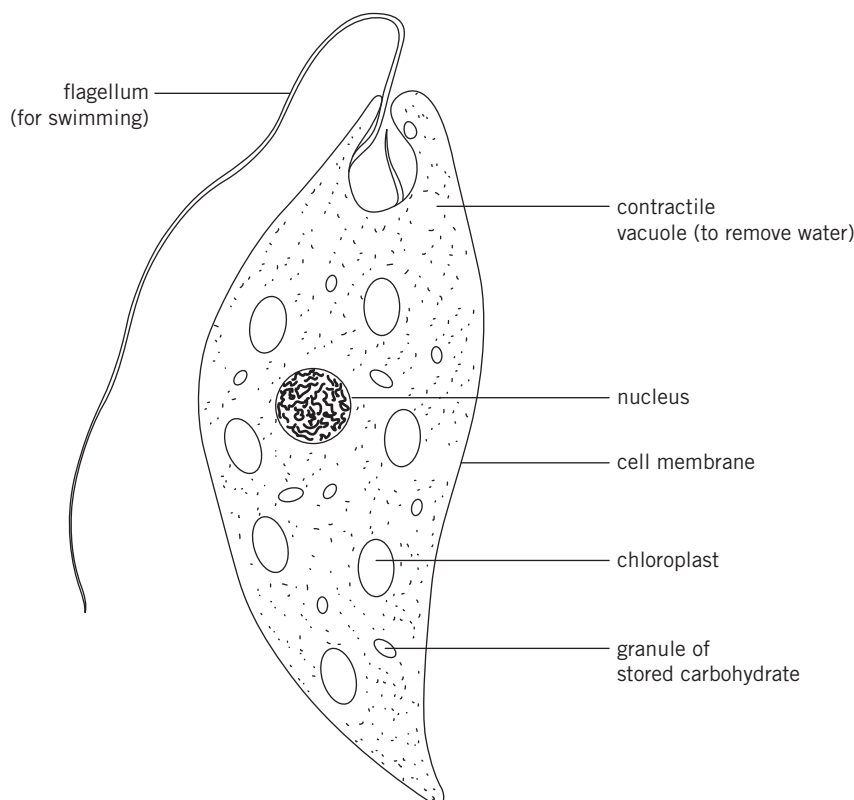
ii. Use the information in this table to complete the following key to identify the four birds.

- | | |
|---------------------------------|---------------------------|
| 1. No large pale areas on head | go to 2 |
| Large pale areas on head | go to 3 |
| 2. All feathers the same colour | <i>Turdus merula</i> |
| Feathers of different colours | <i>Erithacus rubecula</i> |
| 3. | |
| | |

[6]

2. a. Search the internet for images of orang-utan, chimpanzee, ring-tailed lemur, siamang, grass monkey, purple langur, and aye-aye.
- b. Using *only external features* make a key to distinguish between these animals. (Hint: try to begin with a question that divides this group of seven animals into two approximately equal-sized groups.)
- c. These animals are all **primates**. Humans are also primates. Suggest the most important difference between humans and other primates.
- d. Living organisms can also be classified using evidence from DNA. Use the internet to find how much DNA humans have in common with the other seven primates. Suggest which of these animals is most closely related to humans.

1. The diagram shows a single-celled organism called *Euglena gracilis*. This organism has some features which are usually only found in animals and some which are usually found only in plants.



- a. i. State **one** feature of *Euglena* which is usually found only in plants.
..... [1]
- ii. State the characteristic of living organisms which this structure carries out.
..... [1]
- b. i. The contractile vacuole is usually found only in animals. State the characteristic of living organisms carried out by the contractile vacuole.
..... [1]
- ii. The flagellum is more often found in animals. State the characteristic of living organisms carried out by the flagellum.
..... [1]
- c. All living organisms require a supply of energy. State the name of the process which supplies energy to a cell such as *Euglena*.
..... [1]

2. Bacteria fit into the classification group called Prokaryotes. The name comes from the Greek language, explain the meaning of this name.

1. a. Match up the following parts of a plant with the function performed by each of them.

Part of plant
Stem
Root
Leaves
Flowers
Fruit

Function
Absorb water and mineral ions
Usually help dispersal of seed, a reproductive structure
Hold leaves in the best position
May be attractive to pollinating insects or birds
Trap light energy for photosynthesis

[5]

- b. Complete the following paragraphs about the lives of plants. Use words from this list – each word may be used once, more than once, or not at all.

algae angiosperms autotrophic cellulose chlorophyll
 chloroplast dicotyledons ferns herbivorous
 monocotyledons photosynthesis respiration starch

All plants contain the light-absorbing pigment called This means that plants are – they can make their own food molecules from simple inorganic sources by the process of All the members of the Plant Kingdom are made of cells surrounded by a cell wall made of

The Plant Kingdom includes mosses,, and seed plants. Many of the seed plants have the seed enclosed inside a fruit – they are called, and exist in two groups (which have leaves with parallel veins) and (leaves have branched veins).

[8]

Extension

- c. Plants absorb light energy through their leaves.
 Suggest how you could calculate the leaf surface area of a tree close to your school.

1. These four animals were among a group of organisms collected from leaf litter lying on the floor of a deciduous woodland.



- a. Complete the table below to compare the four animals.

	Ant	Earthworm	Centipede	Mite
Number of pairs of jointed legs present				
Are antennae present? (Yes or No)				

[4]

- b. Use this key to place each of the animals in its correct group.

1. Jointed legs present	go to question 2
No jointed legs	<i>Annelid</i>
2. More than four pairs of legs	go to question 3
Four pairs of legs or fewer	go to question 4
3. Body in two main parts, legs not all alike	<i>Crustacean</i>
Body made up of many similar segments, with legs alike one another	<i>Myriapod</i>
4. 3 pairs of legs present	<i>Insect</i>
4 pairs of legs present	<i>Arachnid</i>

Write your answers in the table below.

Animal	Classification group
Ant	
Earthworm	
Centipede	
Mite	

[5]

- c. Insects are members of the phylum *Arthropoda*. Humans have never been able to completely exterminate any insect species, although they have tried to eliminate some species which are pests.

Complete this table to list some species that are harmful and some that are beneficial to humans.



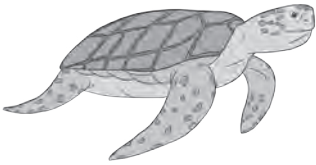


	Name of insect	Reason why it is directly harmful to humans
1		
2		
	Name of insect	Reason why it is beneficial to humans
1		
2		

1. This table compares some features of **chordate (vertebrate)** animals.

a. Define the term chordate (vertebrate).

..... [1]

b. Complete this table.

Chordate	Body covering	Constant body temperature	Parental care of young
		No	No
	Moist skin		No
	Scales	No	
	Feathers		Yes
			Yes

[6]

Extension

c. Humans are vertebrates.

State how many vertebrae are found in a human backbone. Draw a picture of a single vertebra from the lower back of a human.

d. State **two** functions of vertebrae.