

CONCEPT AND USE OF CLASSIFICATION SYSTEM

- Organisms can be classified into groups by the features they share.
- Classification system aims to reflect evolutionary relationships

	<u>Bobcat</u>	<u>Lion</u>	<u>Shaggy mane mushroom</u>
Kingdom	Animalia	Animalia	Fungi
Phylum/division	Chordata	Chordata	Basidiomycota
Class	Mammalia	Mammalia	Homobasidiomycetae
Order	Carnivora	Carnivora	Agaricales
Family	Felidae	Felidae	Copricaceae
Genus	<i>Lynx</i>	<i>Panthera</i>	<i>Coprinus</i>
Species	<i>Lynx rufus</i>	<i>Panthera leo</i>	<i>Coprinus comatus</i>
			

Mnemonic for Classification:

Keep Ponds Clean Or Frogs Get Sick
Kingdom Phylum Class Order Family Genus Species

Links to more topic wise questions:

- **Species:** It is a group of organisms that can reproduce to produce a fertile offspring.
- **Binomial system of naming species:** It is an internationally agreed system in which the scientific name of an organism is made up of two parts showing the genus and the species.
- **Sequence of bases in DNA** are used as a means of classification.
- **Group of organisms that share a more recent ancestor (are more closely related) have base sequences in DNA that are more similar than those that share only a distant ancestor.**

BINOMIAL SYSTEM OF NAMING ORGANISMS

RULES for SCIENTIFIC NAMES

- The entire two-part name must be written in italics (or underlined when handwritten).
- The generic name (**genus**) is always written first.
- The genus name must be capitalized.
- The **specific epithet** (species name) is never capitalized.

Examples:

Common name	Scientific (Generic) name
Modern humans	<i>Homo sapiens</i>
Arabian camel	<i>Camelus dromedarius</i>
African elephant	<i>Loxodonta africana</i>
Albatross	<i>Diomedidae</i>
Alpaca	<i>Lama pacos</i>
Asian Elephant	<i>Elephas maximus</i>
Blackbuck	<i>Antelope cervicapra</i>

Note: All scientific names have been derived from Latin

ADVANTAGES OF USING SCIENTIFIC NAMES:

- It allows for the identification and comparison of organisms based on recognised characteristics
 - It allows all organisms to be named according to a globally recognised scheme
 - It can show how closely related organisms are, allowing for the prediction of evolutionary links
 - It makes it easier to collect, sort and group information about organisms
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DICHOTOMOUS KEYS

1. A dichotomous key is a tool that allows the user to determine the identity of objects and organisms
2. Dichotomous keys offer a number of choices that lead the user to the correct name object or organism.

Following are examples of dichotomous keys from IGCSE Past papers for Biology 0610

ANALYSING QUESTION Q1

1	<p>The diagram shows an animal.</p>  <p>Use the key to identify this animal.</p> <p>1 rounded ears A pointed ears go to 2</p> <p>2 spots on the body B no spots on the body go to 3</p> <p>3 straight tail C curly tail D</p>
Ms-1	D

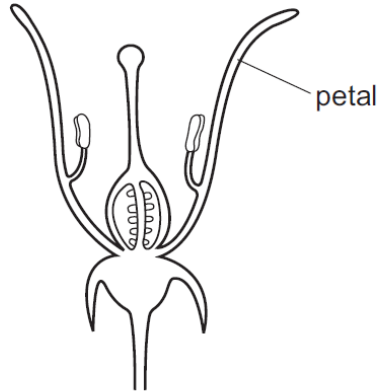
In the above example, there are 4 options for the identity of the organism. Since the ears are not rounded, so we need to proceed to the option 2. Since there are no spots on the body, the organisms is not B. So we go to option 3. As we can see that the tail is not straight, so but obviously, it is organism D with a curly tail.

It is also to be noted that such kind of questions sometimes need the knowledge of various concepts and thus such dichotomous keys can be based on concepts from any part of the syllabus.

YOU MAY TRY TO SOLVE THE FOLLOWING EXAMPLE. NOTE THAT THE ANSWERS ARE ALREADY MENTIONED BELOW THE QUESTIONS. YOU NEED TO GIVE YOUR LOGICAL EXPLANATIONS. IF YOU CAN GIVE PROPER LOGICAL EXPLANATIONS MEANS THAT YOUR CONCEPTS ARE CLEAR.

2

The diagram shows a section through a flower.



Using the key, identify this flower.

- 1 sepals present go to 2
- sepals absent go to 3
- 2 stamens attached to petals **A**
- stamens not attached to petals **B**
- 3 stigma above anthers **C**
- stigma below anthers **D**

Ms-2 A

3

The diagram shows an animal.



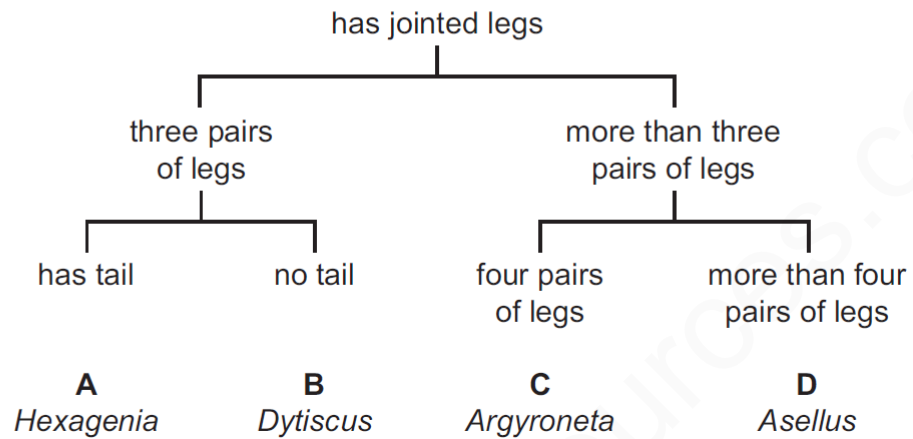
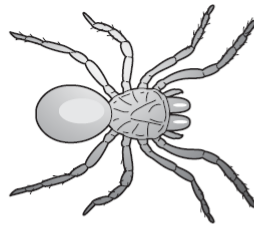
Use the key to identify the animal.

- 1 has legs go to 2
- has no legs go to 3
- 2 has a shell animal **A**
- has no shell animal **B**
- 3 has one muscular foot animal **C**
- has more than one foot animal **D**

Ms-3 C

4

Use the key to identify the animal shown in the diagram.

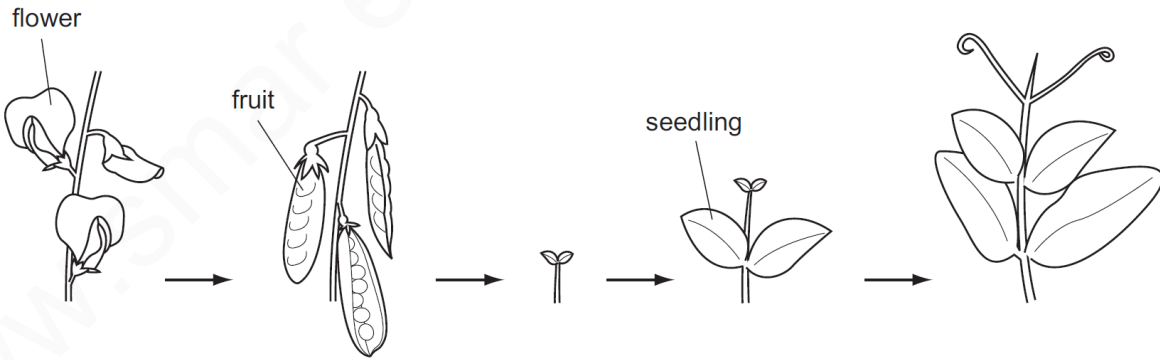


Ms-4

C

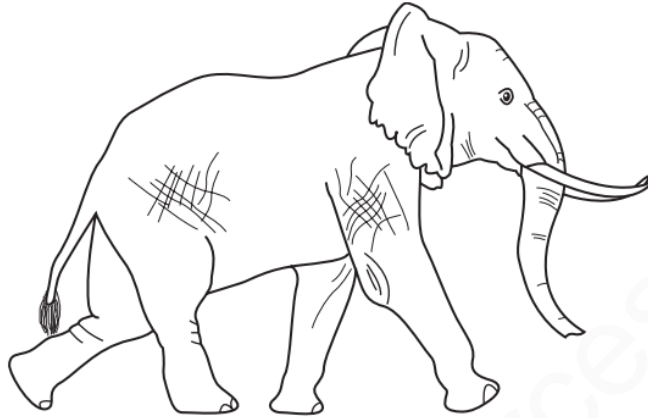
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MULTIPLE CHOICE QUESTIONS

1	<p>What are characteristics of all organisms?</p> <p>A egestion and excretion</p> <p>B egestion and nutrition</p> <p>C excretion and nutrition</p> <p>D nutrition and photosynthesis</p>
Ms-1	C
2	<p>Which organisms carry out respiration, growth, movement and excretion?</p> <p>A all animals and all plants</p> <p>B animals only</p> <p>C plants only</p> <p>D some animals and some plants</p>
Ms-2	A
3	<p>The diagrams show two characteristics of living organisms.</p>  <p>Which characteristics are shown?</p> <p>A excretion and growth</p> <p>B growth and reproduction</p> <p>C reproduction and respiration</p> <p>D respiration and excretion</p>
Ms-3	B

MORE MCQ'S FOR PRACTISE:

- 4 The diagram shows an animal whose scientific name is *Loxodonta africana*.



To which species does it belong?

- A *africana*
- B *Loxodonta*
- C mammal
- D vertebrate

MS: A

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Fig. 4.1 shows three species of zebra.

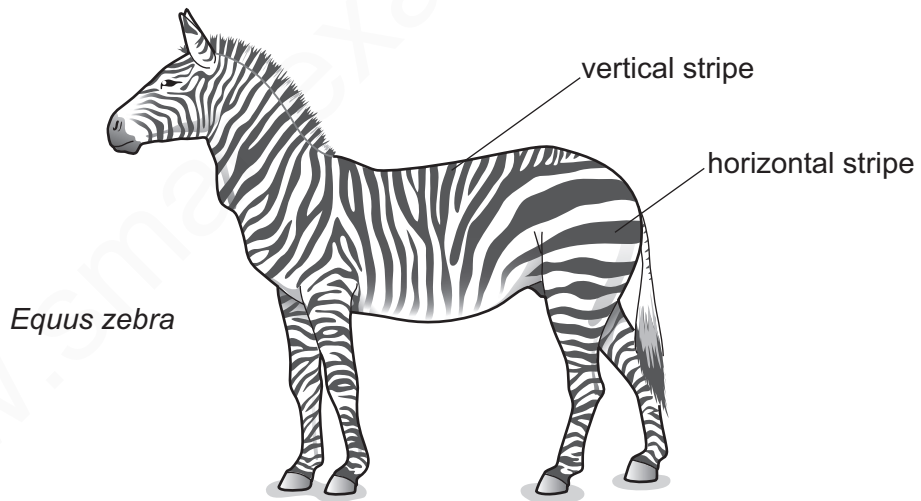
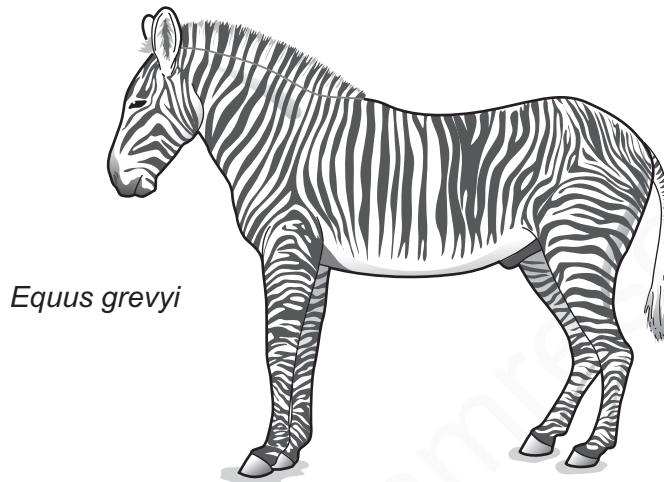
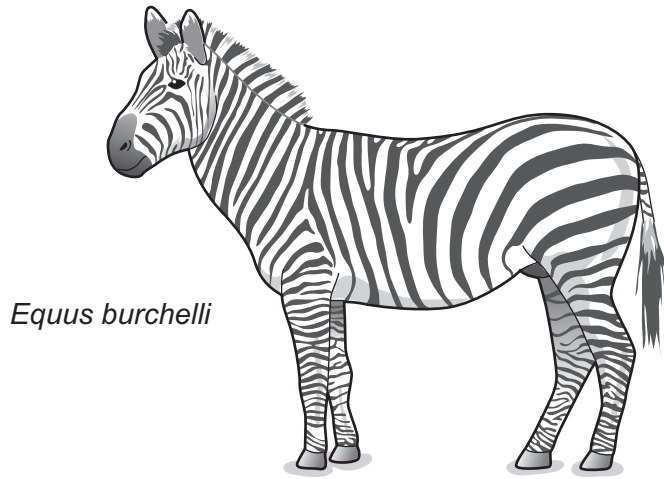


Fig. 4.1

- (a) Describe **one** method a scientist could use to show that the zebras shown in Fig. 4.1 are different species.

.....

..... [1]

MARK SCHEME:

- (a) try to mate them together, failure = suggests different species ;
mate together, no offspring = suggests different species ;
breed together and see if any offspring are, sterile / infertile ;
test DNA / examine chromosomes ;

[max 1]

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(a) Myriapods can be classified into four classes, 1, 2, 3 and 4.

Fig. 1.2 is a dichotomous key that can be used to distinguish the four classes of myriapods.

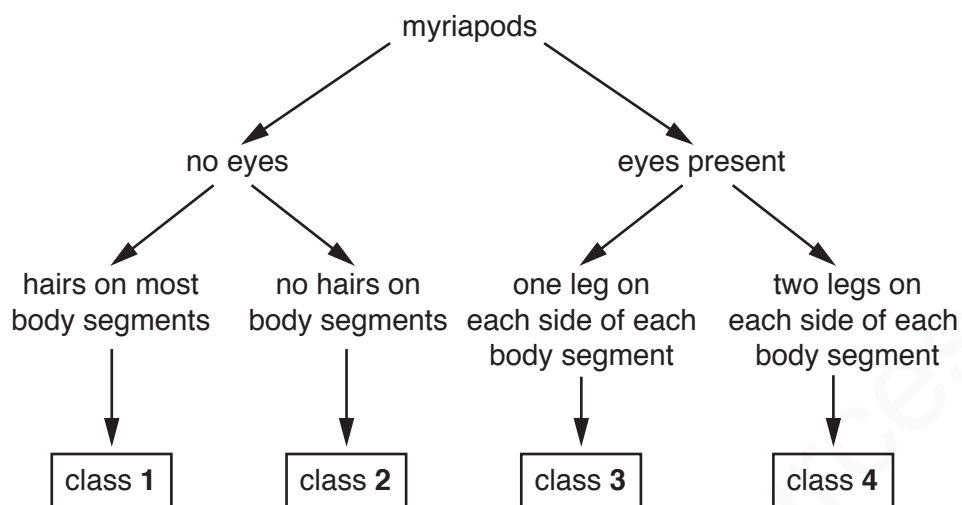


Fig. 1.2

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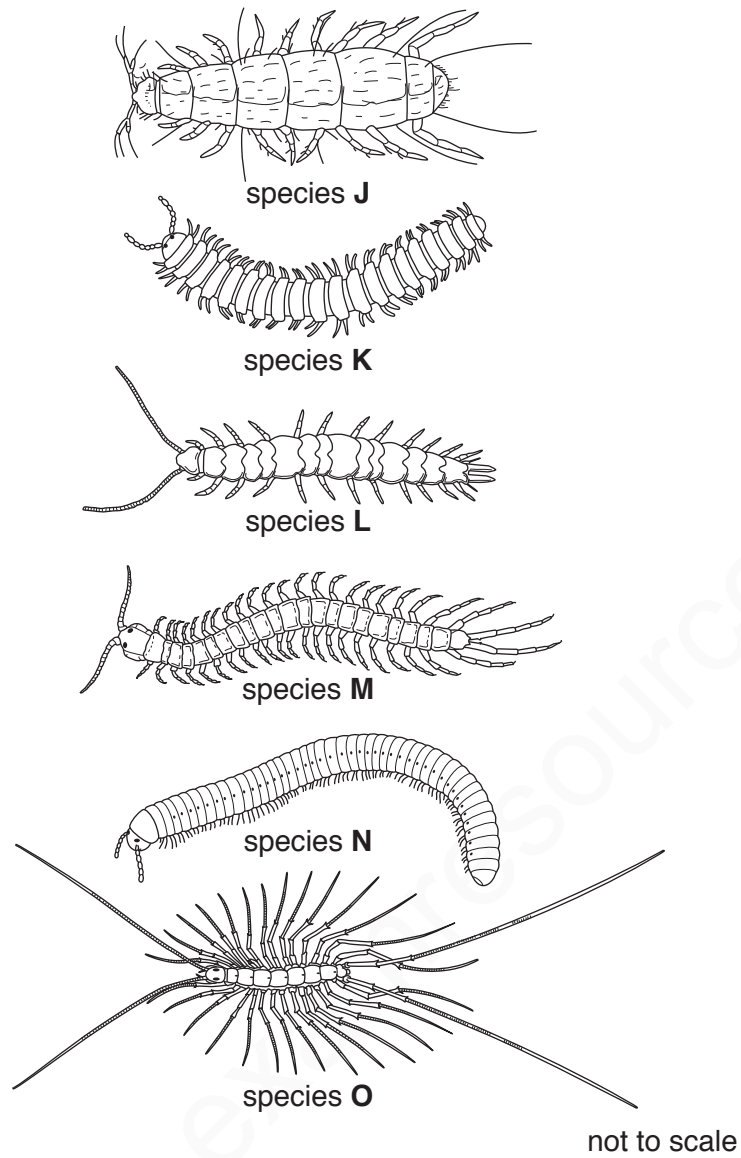


Fig. 1.3

Complete Table 1.1 by using the key in Fig. 1.2 to classify the six myriapods in Fig. 1.3 into the four classes.

Table 1.1

class	letter(s) of species from Fig. 1.3 in each class
1	
2	
3	
4	

[3]

(b) Fig. 1.4 is a photograph of the myriapod, *Apheloria virginiensis*.

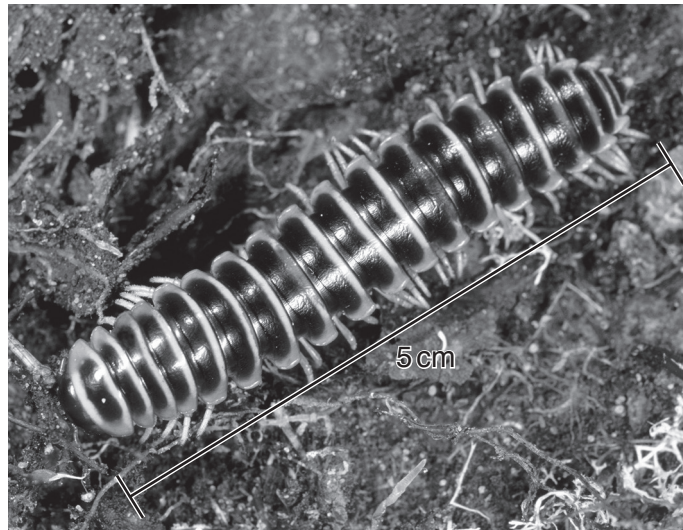


Fig. 1.4

(i) State the genus name and kingdom name for the myriapod shown in Fig. 1.4.

genus

kingdom

[2]

MARK SCHEME:

(a)	class	letter(s) of species from Fig. 1.3 in each class	3 4 rows correct = 3 2 or 3 rows correct = 2 1 row correct = 1
	1	J	
	2	L	
	3	M,	
	4	K,N,O	;;;
(b)	(genus) <i>Apheloria</i> ; (kingdom) animal ;		2

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