

BINOMIAL SYSTEM

1

The Ruddy duck, *Oxyura jamaicensis*, is a native of America.

A flock of 20 birds was introduced into Britain from America before 1950.

The original flock settled quickly in their new habitat and started breeding. Numbers now exceed 6000.

The White-headed duck, *Oxyura leucocephala*, (a native of Spain) is a closely related species to the Ruddy duck.

Female White-headed ducks are more attracted to male Ruddy ducks than to males of their own species.

Cross-breeding between the two species produces a new variety of fertile duck.

The White-headed duck is now threatened with extinction.

Some conservationists are considering a plan to kill the British population of Ruddy ducks to prevent the White-headed duck becoming extinct.

Fig. 6.1 shows a male Ruddy duck.

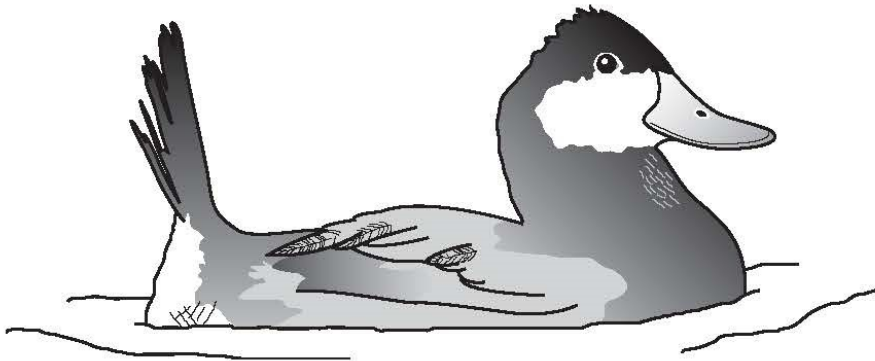


Fig. 6.1

- (b) (i) With reference to an example from the passage, describe what is meant by the term *binomial system*.

.....
..... [2]

- (ii) State two reasons, based on information in the passage, why the Ruddy duck and White-headed duck are considered to be closely related.

1
.....
2

MARKING SCHEME:

- (i) each organism is given two names/ref. to genus and species/trivial;
suitable example (*Oxyura jamaicensis* or *Oxyura leucocephala*); [2]
- (ii) cross-mating results in a fertile + duck/variety/offspring/sub-species/
new species;
they both belong to the + same genus/genus *Oxyura*;
they are attracted to each other AW; max. [2]

Expert solution:

(i) Binomial system means that each organism is given two names. For example *Oxyura jamaicensis*

(ii) Rudy duck and the White headed duck are considered to be closely related because their cross mating results in a fertile offspring. Also they both belong to the same genus *Oxyura*

Note:

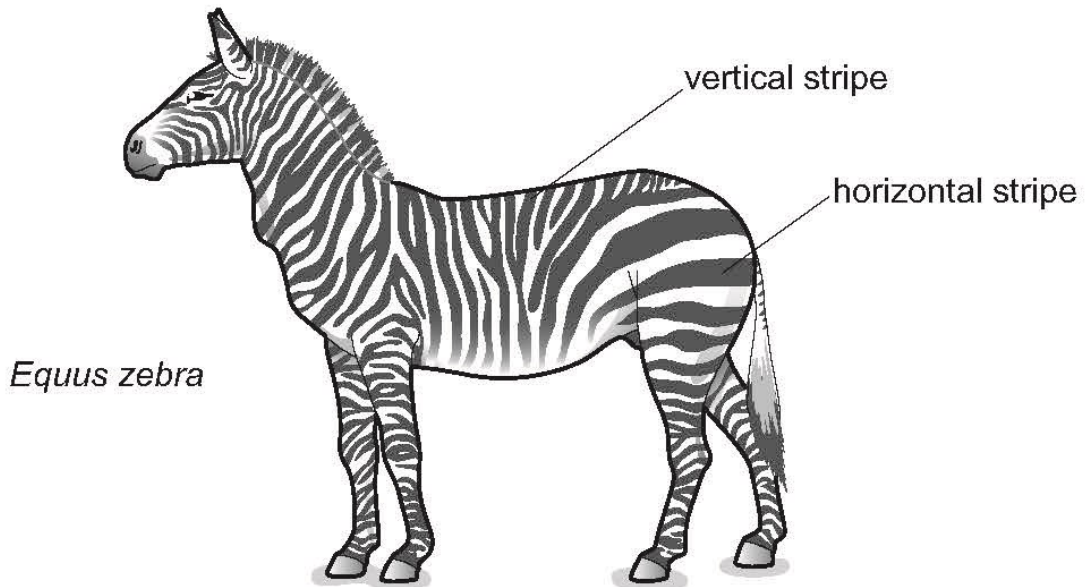
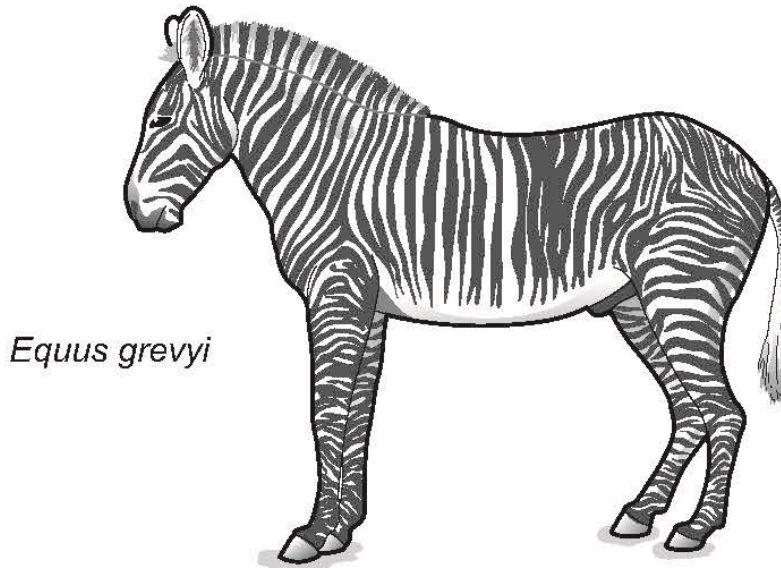
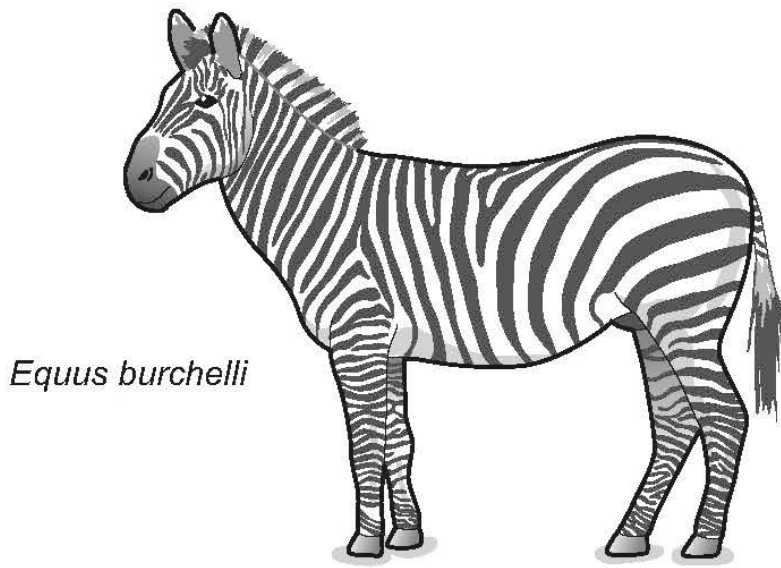
-> Either you make a mention of:

Rudy duck and the White headed duck are considered to be closely related because their cross mating results in a fertile duck [or] a fertile new species [or] a fertile sub-species [or] a fertile variety, you will get a mark . So this can be a substitute for the expert solution point (i)/(ii)

-> They are attracted to each other could also fetch you a mark as a substitute for any one point from (i)/(ii) above.

*** It is important to be able to interpret the markschemes. While all of you have access to the best notes from many sites and many amazing Cambridge endorsed books, what is more important is to be able to present your answers well in the Cambridge approved vocabulary and also know all the accepted vocabulary. This is made possible by our solved past papers that give you all possible accepted answers , because we know that all students do not think alike and hence many variations of the answers are important.***

Fig. 4.1 shows three species of zebra.



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

.....
..... [1]

MARKING 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]

Expert solution:

One method to show that the zebras shown in figure 4.1 are different species is by trying to mate them together and the failure to do so suggests that they are different species .

Note:

Other accepted alternatives:

->If they mate together and it does not result in no offspring , then it suggests that they are different species.

->If they breed together and if it results in a sterile offspring then it suggests they belong to different species.

->Their DNA could be tested or their chromosomes can be examined.

3

The freshwater mussel, *Margaritifera margaritifera*, is a mollusc which lives in rivers and streams.

When the mussel reproduces, gametes are released into the water and fertilisation takes place.

The embryos, in the form of larvae, attach themselves to the gills of fish and develop there for a few months.

The larvae then release themselves and grow in sand in the river, feeding by filtering food from the water.

The number of mussels is falling due to human predation and the species is threatened with extinction.

l (b) Explain how the species name of the freshwater mussel can be distinguished from its genus.

.....
..... [1]

4

(e) State how scientists could show that two populations of slender loris belong to the same species or to two different species.

.....
.....
..... [1]

MARKING SCHEME:

) <i>ideas of the following required</i> breed and have fertile offspring ; examine DNA to show that they are similar / have similar genes ;	[max 1]	
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Expert solution:

The scientist can make them breed together and check if they have a fertile offspring.

Also accepted:

->Examine to see if they have a similar DNA[or check if they have similar genes

5 Fig. 6.1 shows three different insects.



Vespula flavopilosa
insect 1



Vespula rufa
insect 2



Callicera rufa
insect 3

Fig. 6.1

(a) Insects 1 and 2 are more closely related to each other than to insect 3.

(i) Explain how the binomial names indicate that insects 1 and 2 are more closely related.

.....
.....
.....
..... [2]

(ii) Explain how the appearance of the three insects suggests that insects 1 and 2 are more closely related.

.....
.....
.....
..... [2]

MARKING SCHEME:

(a (i))	<i>either</i> insects 1 and 2, are in the same <u>genus</u> / have the same <u>generic</u> name ; (both have) <i>Vespula</i> ; <i>or</i> insect 3 is in a different <u>genus</u> ; (its name is) <i>Callicera</i> ;	[max 2]	<i>ignore</i> any references to the species
(ii)	<i>insects 1 and 2</i> have two pairs of wings ; have antennae that are, long(er) / same shape / thick ; have small(er) eyes ; have stripes / have a pattern / have similar markings ; any correct reference to size ; e.g. 'they have similar size' AVP ; e.g. similar shape of abdomen	[max 2]	R any feature of 1 and 2 that is said to be 'similar' unless qualified A four wings R two wings A 'feelers' / bent shape R stripes on thorax R similar shape unqualified

Expert solution:

(a)(i) Insects 1 and 2 have the same genus. which is *Vespula*.

Note:

Also accepted:

-> Insect 3 is a different genus which is *Callicera*

(a)(ii) Insects 1 and 2 have 2 pairs of wings and they have antennae that are larger than insect 3

Note: Also accepted:

-> They have smaller eyes

-> They have stripes [or they have a pattern [or] They have similar markings

-> They have similar size [or] They have similar shape of abdomen