

Model Answers: Medium

1a

a) i) The following eukaryotic kingdoms contain autotrophic organisms...

- Protocista **AND** Plantae; [1 mark]

ii) The following eukaryotic kingdoms contain heterotrophic organisms...

- Protocista **AND** Fungi **AND** Animalia; [1 mark]

[Total: 2 marks]

It is important that you notice that the question asks for **eukaryotic** kingdoms only!

1b

b) Table should be completed as shown below...

One mark awarded for each correct column:

Feature	Protocista	Fungi	Plantae
Cell walls	Present in some species	√	√
Cell vacuoles	√	√	√
Cilia/flagella	Present in some species	X	X
Motility (ability to move themselves)	Present in some species	X	X
Nervous coordination	X	X	X
	<i>All correct in column</i>	; [1 mark]	; [1 mark]

[Total: 4 marks]

Vacuoles are sac-like structures surrounded by a single membrane. Unlike animal cells, mature plant cells often contain a **large, permanent, central** vacuole. However, animal cells can still contain **small, temporary** vacuoles, such as phagocytic vacuoles or food vacuoles.

1c

c) The names suggest the following evolutionary relationships between the fruit fly species:

- *D. dorsalis* and *D. oleae* are more closely related to each other (than *C. capitata*); [1 mark]
- Because they are in the same genus; [1 mark]
- Which means they have a more recent common ancestor / *C. capitata* has a more distant common ancestor with *D. dorsalis* and *D. oleae* (than they do with each other); [1 mark]

[Total: 3 marks]

2a

a) Viruses are not included in the three-domain classification system because...

- They are acellular **OR** they do not have a cellular structure **OR** they are classified as non-living; [1 mark]

[Total: 1 mark]

2b

b) The arguments against viruses being classed as living organisms include...

Up to **three** of the following:

- (Viruses) have no metabolism / do not metabolise; [1 mark]

- (Viruses) have no respiration / do not respire; [1 mark]
- (Viruses) cannot produce biological molecules/biochemicals on their own **OR** viruses cannot make / have no mechanism for making their own proteins; [1 mark]
- (Viruses) cannot make/replicate their nucleic acids on their own **OR** (viruses) rely on host cells to make their nucleic acids; [1 mark]
- (Viruses) cannot reproduce on their own **OR** (viruses) rely on host cells to reproduce; [1 mark]

The arguments for viruses being classed as living organisms include...

Up to **three** of the following:

- *The idea that:* all organisms are interdependent / many organism rely on host organisms (for certain aspects of their life history / for certain biological functions) **SO** relying on a host for reproduction may not mean viruses are non-living; [1 mark]
- Viruses have genes (as in living organisms) **OR** viral nucleic acids/genes that code for the production of proteins (as in living organisms); [1 mark]
- *The idea that:* (like other living organisms) viruses have niches / are highly specialised e.g. require specific host cells for reproduction; [1 mark]
- Viruses evolve **OR** viral genomes change over time/respond to changes in environment/host; [1 mark]

[Total: 5 marks]

2c

c) The two main features that are used to classify viruses are...

- The type of nucleic acid **OR** whether the virus contains DNA or RNA; [1 mark]
- The number of strands in their nucleic acids **OR** whether the nucleic acids / DNA or RNA of the virus is single-stranded or double-stranded / one or two strands; [1 mark]

[Total: 2 marks]