

Solutions

Each answer shows the steps, then the **result**.

2.1

- a group of organisms that can interbreed to produce fertile offspring

2.2

- kingdom
- order
- family
- genus

3.1 C

- Organisms with a nucleus are in the Eukarya domain

3.2 B

- Viruses are classified by nucleic acid type and strandedness

3.3

(a)

- Fungi feed by absorbing food (not photosynthesis); Fungi have chitin cell walls (Plants have cellulose)

(b)

- they differ in their membrane lipids, ribosomal RNA and cell-wall composition, showing they are only distantly related

3.4

- it cannot be applied to organisms that reproduce asexually / to extinct/fossil species / where two groups rarely meet to test interbreeding

3.5

(a)

- Domain, kingdom, phylum, class, order, family, genus, species

(b)

- The name has two parts: the **genus** first, with a capital letter — *Canis* — and the **species** second, in lower case — *lupus*; the whole name is printed in italics, or underlined when handwritten

(c)

- **Bacteria** — prokaryotic, with peptidoglycan in the cell wall. **Archaea** — prokaryotic, but no peptidoglycan and with different membrane lipids and RNA polymerase,

closer to eukaryotes. **Eukarya** — cells have a true nucleus and membrane-bound organelles

(d)

- Molecular data — DNA and RNA sequences and amino acid sequences — measure ancestry directly, rather than inferring it from appearance; it revealed that the prokaryotes are two deeply distinct groups, which is why the three-domain system replaced the old five-kingdom one; it also separates organisms that merely look alike through convergent evolution from those that are genuinely related