Exercise walk-through

6.4
Evolution, genetics and evidence (4.6.3)

AQA · GCSE · Biology

Reproduction and meiosis

- **Sexual reproduction** involves the joining of male and female sex cells, each called a **gamete** : sperm and egg cells in animals, pollen and egg cells in flowering plants.
- It mixes genetic information from two parents, so the offspring vary. **Asexual reproduction** involves only one parent and no gametes.
- Its offspring are genetically identical to the parent, a **clone** (apart from any mutations).
- In plants and animals it uses cell division by **mitosis** .

DNA, genes and the genome

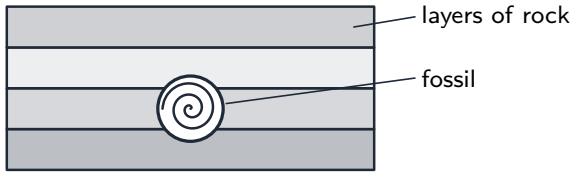
- DNA is a **polymer** made of two strands twisted into a **double helix** .
- It is found in the nucleus, in structures called chromosomes.
- A **gene** is a small section of DNA that codes for a particular sequence of amino acids, which makes a particular protein.
- The **genome** is all the genetic material of an organism.

Selective breeding, genetic engineering and cloning (2)

- **Embryo transplants** : cells are split apart from a young animal embryo before they specialise, and each one grows into an identical embryo, which is placed in a host mother.
- **Adult cell cloning** : the nucleus is removed from an unfertilised egg; the nucleus from an adult body cell is put in its place; an electric shock makes the egg divide into an embryo; the embryo is placed in the uterus of a host mother. Dolly the sheep, born in 1996, was cloned in this way.

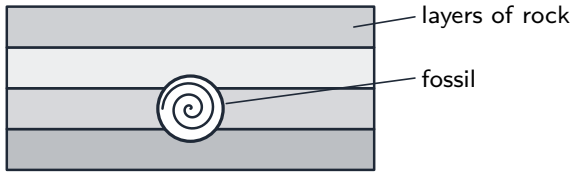
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2.1 Give **two** ways in which fossils can form. [2]



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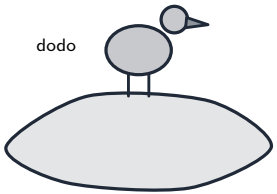


2.1

- any two: hard parts (bones, shells) do not decay; parts are slowly replaced by minerals; the organism is kept where there is no decay (no oxygen, too cold, too acidic); traces such as footprints or burrows are preserved in rock

Exercise 2.2

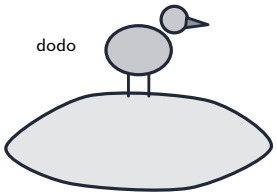
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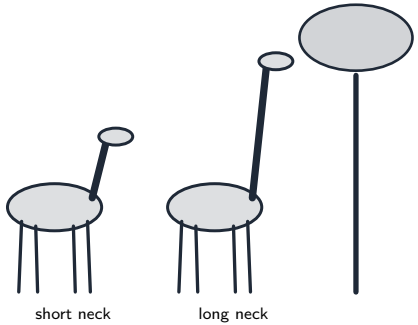


2.2

- any two: new diseases; new competitors; a change in the environment, e.g. climate; a single disaster, e.g. a volcano or an asteroid

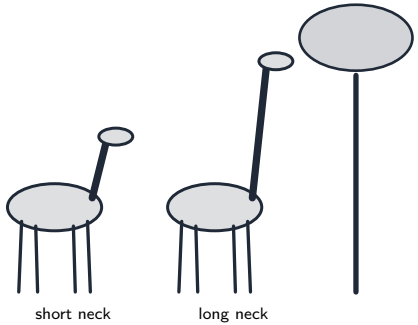
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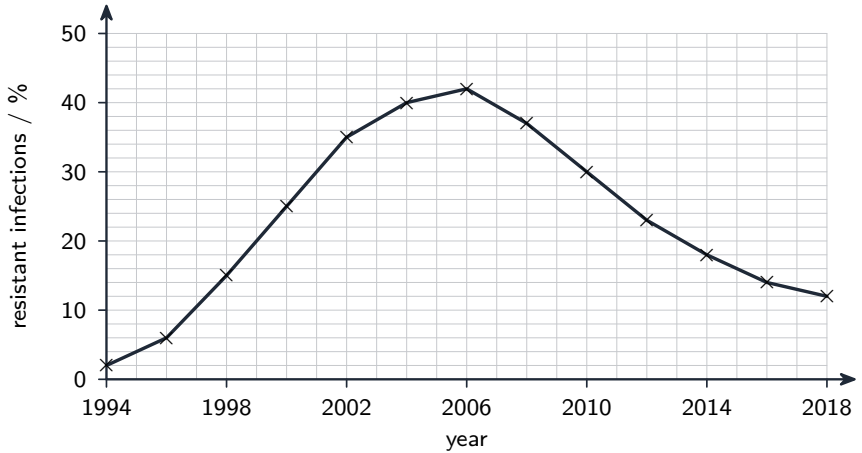
3.1

- giraffes showed variation in neck length, caused by their genes
- those with longer necks reached more food, so they survived and reproduced
- they passed on the alleles for long necks; over many generations most giraffes had long necks

Exercise 3.2 (a)

3.2 A hospital recorded the percentage of *Staphylococcus* infections that were resistant to the antibiotic methicillin (MRSA).

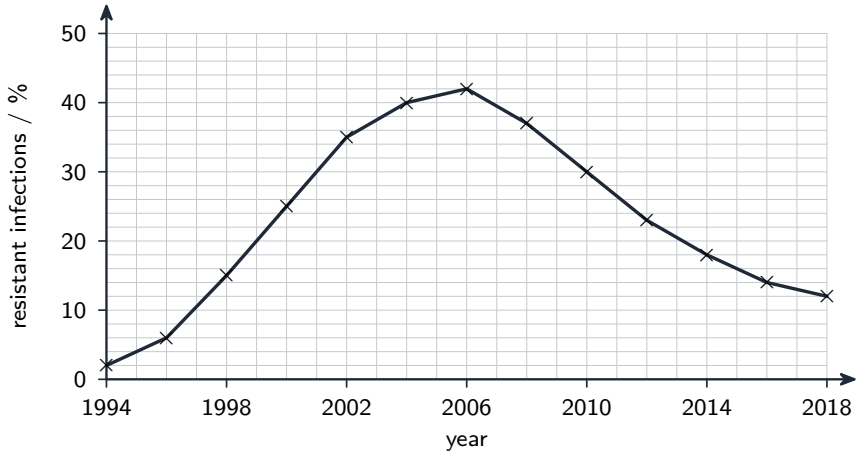
(a) Calculate how many times greater the percentage was in 2006 than in 1994. [2]



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(a) 42% and 2% read from the graph; $42 \div 2 = \mathbf{21}$ times

Exercise 3.2 (b)

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(b) a mutation makes a bacterium resistant; the antibiotic kills the bacteria that are not resistant; the resistant bacteria survive and reproduce, so the resistant strain spreads

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(c) any two: fewer antibiotics given when they are not needed; better hygiene, e.g. hand washing; infected patients kept apart

Exercise 3.2 (d)

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(d) Explain what doctors, patients and farmers can do to slow down the development of resistant bacteria, and why new antibiotics cannot solve the problem quickly. [6]

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(d) points to include:

- doctors give antibiotics only for bacterial infections, not for viruses or mild illness
- doctors use the right antibiotic for the bacterium
- patients finish the whole course, so all the bacteria are killed
- farmers use fewer antibiotics in animals
- new antibiotics take many years to develop and test, and cost a lot

Levels: **5–6** a full, logical answer with correct biology and correct terms; **3–4** several correct points, partly linked; **1–2** one or two relevant points.