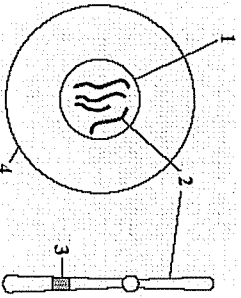


Why organisms are different and reproduction

- The diagram shows a human egg.



Match structures, A, B, C and D, with the labels 1–4 on the diagram.

- A cell
- B nucleus
- C chromosome
- D gene

- These young rabbits look like their parents.

This is because information about characteristics such as fur colour is passed from parent to their young.



Match words, A, B, C and D, with the numbers 1–4 in the sentences.

- A chromosomes
- B genes
- C nucleus
- D sex

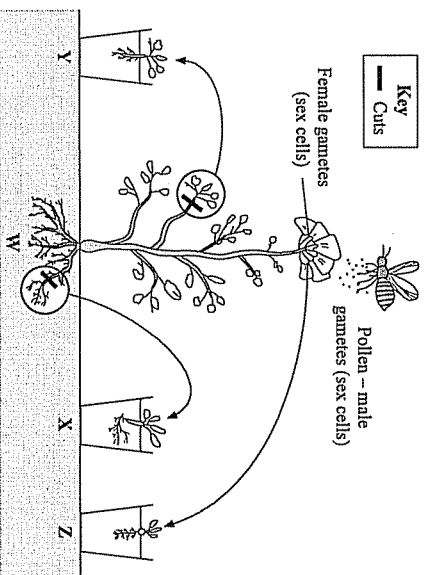
Information is passed from parents to their young in ... 1 ... cells.

Each characteristic, eg fur colour, is controlled by ... 2 ...

The structures which carry information for a large number of characteristics are called ... 3 ...

The part of the cell which contains these structures is called the ... 4 ...

- New plants may be produced from older adult plants in a variety of ways. Three of these are shown in the diagram.



- Which process has been used to produce plant X?
 - taking cuttings
 - sexual reproduction
 - adult cell cloning
 - embryo transfer

- Which process has been used to produce plant Z?
 - taking cuttings
 - sexual reproduction
 - adult cell cloning
 - embryo transfer

- Which of these plants will have genes which are all identical to the adult plant (W)?
 - X and Y
 - X, Y and Z
 - Y and Z
 - X and Z

- Producing new plants by the method used to produce plant Y is ...
 - quick and cheap.
 - quick and expensive.
 - slow and expensive.
 - slow and cheap.

Progress check
Unit B1, B1.7.1 & B1.7.2

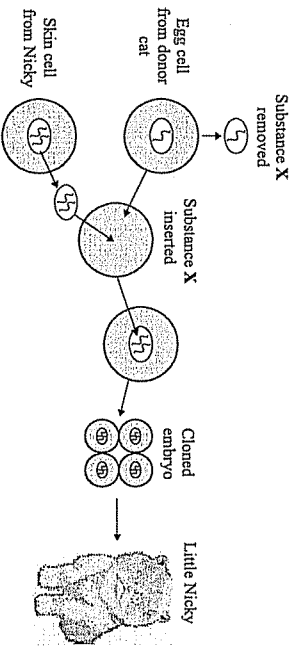
4. In each part choose only one answer.

Read the passage below about cloning.

The first cloned-to-order pet sold in the United States is named Little Nicky, a 9-week-old kitten delivered to a Texas woman saddened by the loss of a cat she had owned for 17 years. The kitten cost its owner \$50 000 and was created from substance X from her beloved cat, named Nicky, who died last year.

"He is identical. His personality is the same," the owner, Julie, told The Associated Press in a telephone interview. She asked that her last name and home town not be disclosed because she said she fears being targeted by groups opposed to cloning.

The diagram shows how Nicky was cloned.



A Substance X is ...

- 1 carbohydrate.
- 2 DNA.
- 3 fat.
- 4 protein.

B This technique involves ...

- 1 asexual reproduction.
- 2 fertilisation.
- 3 mutations.
- 4 sexual reproduction.

C Nicky and Little Nicky are identical because they have the same ...

- 1 cells.
- 2 enzymes.
- 3 genes.
- 4 personality.

Progress check
Unit B1, B1.7.1 & B1.7.2

D On which grounds are people most likely to object to this technique?

- 1 economic
- 2 ethical
- 3 scientific
- 4 social

5. In each part choose only one answer.

This question is about genetically modified food.

Read the passage.

In 1996, two supermarkets started to sell genetically modified (GM) tomato puree, a paste made by cooking GM tomatoes. It was cheaper than non-GM puree and sold very quickly. The GM tomatoes contained a transferred gene which allowed them to keep ripe longer. The GM tomatoes were grown in America because the British climate was not suitable. Laws prevented uncooked GM tomatoes from being sold in Europe. The cans of tomato puree were clearly labelled to show that the GM puree was made from GM tomatoes. In 1999, the supermarkets stopped selling the GM tomato puree.

A Why were the GM tomatoes produced in the first place?

- 1 to produce cheaper puree
- 2 to produce faster puree
- 3 to produce a bigger crop in America
- 4 to produce larger tomatoes

B Which of the following is the most likely reason to explain why people stopped buying the GM tomato puree?

- 1 concern about the effects on the British economy
- 2 concern about the effect on the environment of growing GM crops
- 3 European laws prohibiting the sale of GM tomatoes
- 4 the tomatoes could not be grown in Britain

C How are GM tomatoes produced in the first place?

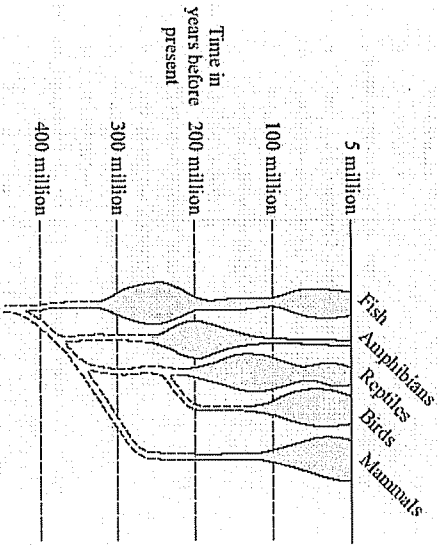
- 1 producing clones from a mutated plant
- 2 fusing cells of young tomato plants
- 3 sexual reproduction of two varieties of tomato plant
- 4 transferring genes from another species

D Why were the tins of tomato puree labelled to show that they had been made using GM tomatoes?

- 1 because the supermarkets were worried about health effects
- 2 so that the public could choose GM or non-GM puree
- 3 to inform the public about genetic engineering
- 4 to raise public concern over GM crops

Evolution

1. The diagram shows how the number of species in different groups of vertebrates has changed between 400 million years ago and 5 million years ago.
The wider a block is, the more species there are.



Match vertebrates, A, B, C and D, with the numbers 1–4 in the sentences.

- A fish
B amphibians
C reptiles
D mammals
- The group with most species 200 million years ago was ... 1 ...
Birds are most closely related to ... 2 ...
250 million years ago, the vertebrates on Earth were mainly ... 3 ...
The group with most species 5 million years ago was ... 4 ...

2. There are several theories of how new species of plants and animals have developed.

The statements below outline four of these theories.

- **Creationism:**
Each organism is made independently.
Evolution does not occur.
Gaps in the fossil record support this idea.
- **Intelligent Design:**
Living things work in too complex a way for them to have evolved by chance.
A higher being has designed all living things.
- **Lamarckism:**
Changes occur during the lifetime of an individual.
These changes can be passed on to offspring.
- **Darwinism:**
Variation exists between members of a population.
Only the organisms best suited to a habitat survive.
Survivors pass on their advantages to their offspring.

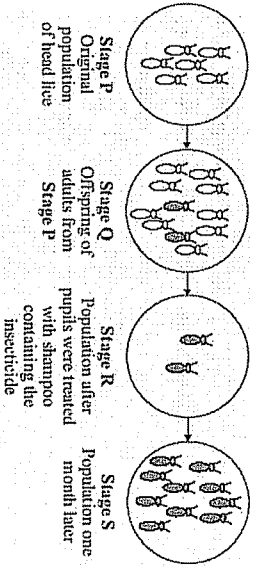
Use the above information and your own knowledge and understanding to answer this question.

Match the theories, A, B, C and D, with the numbers 1–4 in the sentences.

- A Creationism
B Intelligent Design
C Lamarckism
D Darwinism
- The idea that Manx cats, which have no tails, are the offspring of a cat which originally lost its tail in an accident could be used to support ... 1 ...
Unsuccessful competitors die and so do not reproduce, is part of the theory of ... 2 ...
The complicated way in which cells work can be used to support ... 3 ...
The observation that fossils of all the different kinds of animals appear suddenly in the rocks, with no evidence of ancestors, supports ... 4 ...

Progress check
Unit B1, B1.8.1

3. Head lice are insects that live in human hair. Hair can be treated with special shampoo containing an insecticide that kills head lice.
- The diagrams show the development of the population of a new strain of head lice that appeared in the hair of pupils attending the same school.
- Each diagram represents the number of head lice that were found in the hair of the pupils of one class at intervals over several months.



Key: and represent different strains of head lice.

- (a) A mutation that produced a new strain of head lice occurred
- during Stage R.
 - between Stage P and Stage Q.
 - between Stage Q and Stage R.
 - between Stage R and Stage S.
- (b) The head lice in Stage R
- must be impossible to kill.
 - must be unable to reproduce.
 - have identical genes to those in Stage P.
 - must be resistant to the insecticide in the shampoo.
- (c) The composition of the population of head lice at Stage R is due to
- competition.
 - camouflage.
 - genetic engineering.
 - natural selection.
- (d) The head lice at Stage S will continue to multiply until
- all of them die through lack of food.
 - all of them change back to the strain shown in Stage P.
 - a new insecticide is developed.
 - they suffer from overcrowding.

Progress check
Unit B1, B1.8.1

4. The pictures show an echidna and a hedgehog.

Echidna



Hedgehog



Read the information about echidnas and hedgehogs.

- Echidnas and hedgehogs look similar, but they are unrelated species.
- Echidnas live in Australia; hedgehogs live in many countries, including Britain.
- Both echidnas and hedgehogs are covered with sharp spines.
- Echidnas lay eggs; hedgehogs give birth to live babies.
- There is no evidence that echidnas have ever lived in Britain.
- There is no evidence that hedgehogs have ever lived in Australia.

- (a) The information above indicates that echidnas and hedgehogs
- have a similar diet.
 - have a similar life expectancy.
 - evolved from the same ancestor.
 - evolved spines completely independently of each other.
- (b) The information above suggests that echidnas and hedgehogs
- are adapted to similar environments.
 - have spines of the same length.
 - are the same colour.
 - have bodies that allow them to curl up into a ball.
- (c) The outer covering of echidnas and hedgehogs is an adaptation for
- attracting mates.
 - camouflage.
 - defence.
 - insulation.
- (d) The outer covering of the echidna and the hedgehog developed initially
- in response to changes in their environments.
 - as a result of being attacked by predators.
 - as a result of mutations.
 - as a result of variation.