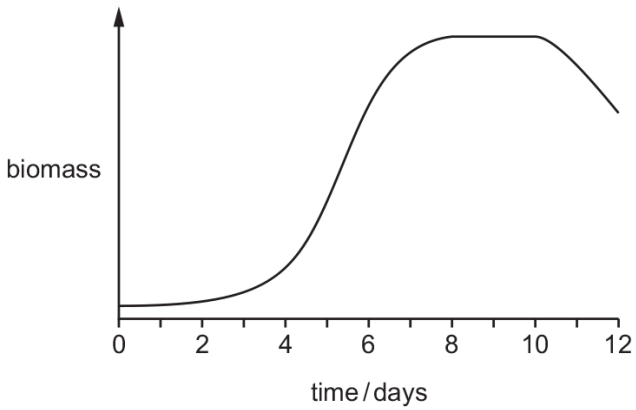
01. 0610_w16_qp_23 Q: 36

The graph shows the growth of a yeast population.



When was the rate at which cells were dying equal to the rate at which new cells were being formed?

A day 3 **B** day 5 **C** day 9 **D** day 11

20.3 Genetic engineering

02. 0610_s21_qp_22 Q: 39

Bacteria can be used to make human proteins.

Which statement explains why this is possible when a human gene is placed in a bacterial cell?

A Bacteria are able to reproduce rapidly.

B Bacteria are very small organisms.

C Bacteria contain genetic material in plasmids.

D Bacteria have the same genetic code as humans.

---

03. 0610_w21_qp_21 Q: 37

Bacteria can be genetically engineered to produce human protein.

What happens during this process?

A The human plasmids are isolated using restriction enzymes.

B Ligase is used to create sticky ends in bacterial plasmids.

C Restriction enzymes are used to create sticky ends in human DNA.

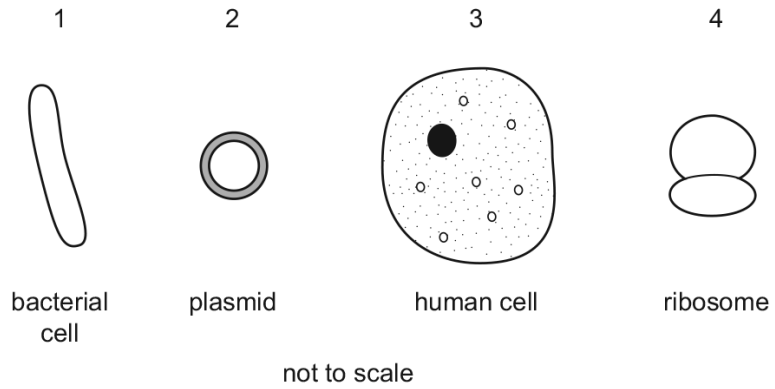
D Human DNA is isolated using ligase.

---

04. 0610_w21_qp_21 Q: 38

Human insulin is a protein that can be made by genetically engineered bacteria. This involves the transfer of genetic information to bacteria.

The diagrams show cells and parts of cells involved in this process.



What is the correct order of transfer of genetic information?

A 3 → 2 → 1 → 4

B 1 → 2 → 4 → 3

C 3 → 4 → 2 → 1

D 1 → 2 → 3 → 4

---

05. 0610_w21_qp_23 Q: 38

Bacteria can be genetically engineered to produce human proteins, such as human insulin.

Which enzyme is used to join the human gene and the bacterial plasmid together to create a recombinant plasmid?

A lipase

B recombinant enzyme

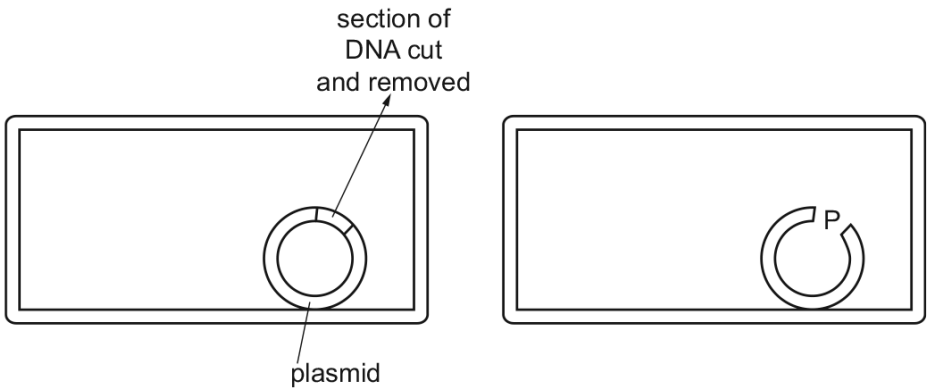
C DNA ligase

D restriction enzyme

---

06. 0610_p20_qp_20 Q: 38

The diagram shows a bacterium whose plasmid is being used during genetic engineering to produce human insulin.



What is inserted at P so that the bacterium can produce human insulin, and which enzyme is used to catalyse the insertion?

A a section of human DNA, using DNA ligase

B a section of human DNA, using restriction enzymes

C a section of human mRNA, using DNA ligase

D a section of human mRNA, using restriction enzymes

---

07. 0610_s20_qp_21 Q: 38

A crop plant has been genetically modified to make it resistant to herbicides.

Which is a possible disadvantage of introducing this new crop plant?

A Loss of weeds reduces competition.

B Some weeds might become resistant to the herbicide.

C The crop plant is unharmed and produces a higher yield.

D The new gene will appear in new generations of the crop.

---

08. 0610_w20_qp_22 Q: 38

The stages describe how genetic engineering can be used to produce human insulin from bacteria.

1 cut bacterial plasmid DNA with restriction enzymes

2 extract gene for insulin from human DNA with restriction enzymes

3 insert recombinant plasmid into bacteria

4 join human DNA to bacterial plasmid DNA using DNA ligase

5 replicate bacteria containing recombinant plasmid

Which sequence will lead to the production of human insulin by bacteria?

A $2 \rightarrow 1 \rightarrow 4 \rightarrow 3 \rightarrow 5$

B $2 \rightarrow 5 \rightarrow 1 \rightarrow 3 \rightarrow 4$

C $4 \rightarrow 2 \rightarrow 3 \rightarrow 1 \rightarrow 5$

D $4 \rightarrow 3 \rightarrow 5 \rightarrow 1 \rightarrow 2$

---

09. 0610_w20_qp_23 Q: 38

Bacteria are used to make insulin.

This happens in several stages.

1 bacteria synthesise insulin in fermenters

2 the insulin gene is inserted into a bacterial plasmid

3 removal of the insulin gene from a human chromosome

4 a section of a plasmid is removed

In which order do these stages occur?

A $1 \rightarrow 3 \rightarrow 2 \rightarrow 4$

B $1 \rightarrow 4 \rightarrow 3 \rightarrow 2$

C $4 \rightarrow 2 \rightarrow 3 \rightarrow 1$

D $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$

---

10. 0610_m19_qp_22 Q: 38

Which statement describes the role of DNA ligase in genetic engineering?

A cuts open a bacterial plasmid

B joins the human gene to the plasmid

C inserts plasmid back into bacterium

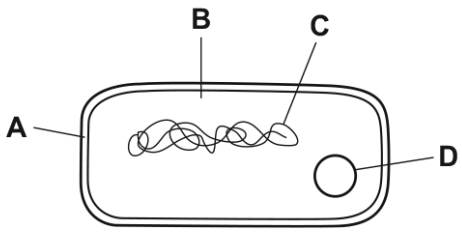
D isolates a human gene

---

11. 0610_s19_qp_21 Q: 38

The diagram shows a bacterial cell.

Which part of its structure is particularly useful in genetic engineering?



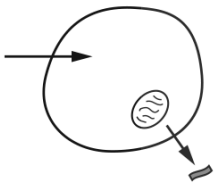
---

12. 0610_s19_qp_23 Q: 39

The diagrams show the stages in the production of human insulin.

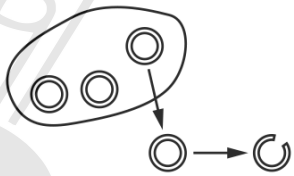
Which stage uses the enzyme DNA ligase?

A



gene for insulin identified and removed from a human cell

B

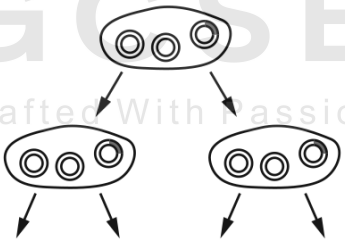


plasmid is removed from a bacterium and cut open

C

the gene for insulin is inserted into the plasmid

D



the plasmid is inserted into a bacterium which reproduces and insulin is produced

---

13. 0610_m18_qp_22 Q: 37

Human insulin can be produced in large quantities by modified *E. coli* bacteria.

Four of the steps in this production process are listed.

1 Insulin is removed from the bacterial culture.

2 An enzyme is used to cut out the insulin gene from a human chromosome.

3 The insulin gene is placed into the plasmid of the bacterium.

4 Bacteria with the insulin gene reproduce very rapidly.

What is the order of these steps?

A $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

B $1 \rightarrow 3 \rightarrow 4 \rightarrow 2$

C $2 \rightarrow 3 \rightarrow 4 \rightarrow 1$

D $4 \rightarrow 1 \rightarrow 2 \rightarrow 3$

---

14. 0610_s18_qp_22 Q: 37

What is a disadvantage of using bacteria to produce human insulin?

A few ethical concerns

B genetic code shared with other organisms

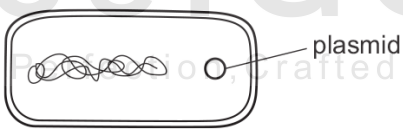
C they contain plasmids

D they mutate frequently

---

15. 0610_s18_qp_22 Q: 38

The diagram shows a bacterial cell containing a plasmid.



What is inserted into the plasmid if this cell is to be used for the production of insulin?

A a length of DNA from a human

B a length of DNA from another bacterium

C a molecule of insulin

D an enzyme

---

16. 0610_s18_qp_23 Q: 37

Which feature of bacteria makes it possible for them to be used to produce human insulin?

A Bacteria possess plasmids.

B Bacteria possess exactly the same DNA base sequences as humans.

C Bacteria possess the same genes for insulin.

D Bacteria possess the same number of chromosomes as humans.

---

17. 0610_s18_qp_23 Q: 38

In some areas, farmers who grow genetically modified (GM) corn have to make sure there is a gap between GM and non-GM crops.

What is the reason for leaving a gap between the crops?

A so they can get large machinery into the fields

B to prevent cross-pollination between GM and non-GM crops

C to prevent disease spreading between crops

D to prevent pests attacking crops

---

18. 0610_w18_qp_21 Q: 38

What is an example of genetic engineering?

A using enzymes to make washing powders

B using pectinase to make fruit juice

C producing plants that have been given genes for resistance to insect pests

D using yeast to make bread

---

19. 0610_w18_qp_22 Q: 38

Genetic engineering involves various stages.

1 human DNA is inserted into bacterial plasmid DNA

2 recombinant plasmid inserted into bacteria

3 restriction enzyme cuts bacterial plasmid DNA

4 restriction enzyme cuts human DNA

What is the correct sequence for genetic engineering?

A $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

B $2 \rightarrow 3 \rightarrow 4 \rightarrow 1$

C $3 \rightarrow 2 \rightarrow 4 \rightarrow 1$

D $4 \rightarrow 3 \rightarrow 1 \rightarrow 2$

---

20. 0610_w18_qp_23 Q: 37

Insulin is now produced using genetically modified bacteria. Previously, diabetics were given insulin extracted from the pancreas of animals.

Why is the insulin from bacteria regarded as a better ethical choice?

A insulin is produced from bacterial DNA

B it is accepted by vegetarians

C plasmids are involved

D the genetic code is shared

---

21. 0610_w18_qp_23 Q: 38

Plasmids are often used in genetic engineering.

What is a plasmid?

A bacterial cell

B gene

C loop of DNA

D protein

---

22. 0610_m17_qp_22 Q: 38

Genes are isolated from human DNA using ……1…… enzymes.

A bacterial plasmid is cut with the same enzyme forming ……2…… .

The human DNA is inserted into the bacterial plasmid using the enzyme ……3…… forming a ……4…… plasmid.

Which row correctly completes gaps 1, 2, 3 and 4?

	1	2	3	4
A	ligase	sticky ends	protease	restriction
B	recombinant	new DNA	ligase	daughter
C	restriction	daughter plasmids	ligase	diploid
D	restriction	sticky ends	ligase	recombinant

---

23. 0610_s17_qp_23 Q: 38

Which is an example of genetic engineering?

A altering the DNA in crop plants so they are resistant to herbicides

B only breeding from crop plants that are resistant to insect pests

C production of insulin in the pancreas

D using yeast to produce ethanol for biofuels

---

24. 0610_w17_qp_21 Q: 38

Ligase enzymes are used in genetic engineering to

A cut open plasmid DNA.

B insert plasmids into bacteria.

C isolate the DNA making up a human gene.

D join human DNA to plasmid DNA.

---

25. 0610_w17_qp_23 Q: 38

With which kingdoms do bacteria share the same genetic code?

A animal, plant, fungus and protoctist

B animal, plant and fungus only

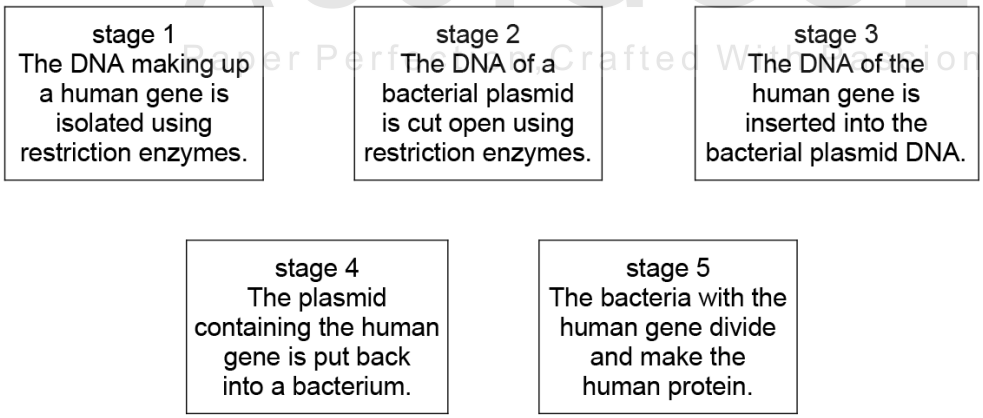
C animal and plant only

D animal only

---

26. 0610_m16_qp_22 Q: 39

The diagram shows five stages in genetic engineering.



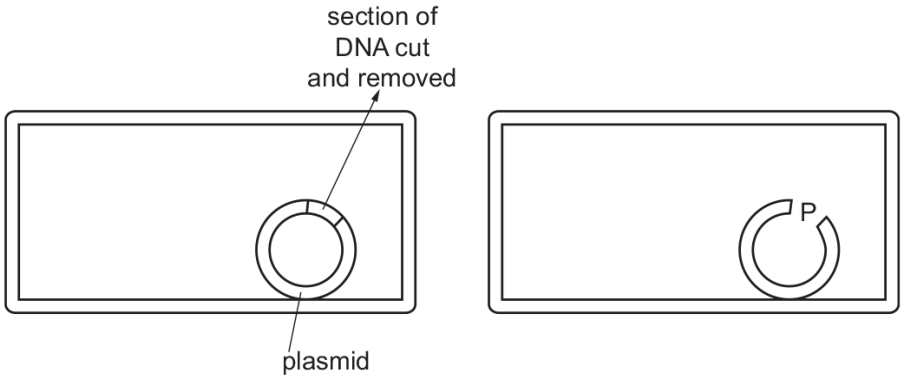
Which stages involve the formation of sticky ends?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

---

27. 0610_p16_qp_20 Q: 38

The diagram shows a bacterium whose plasmid is being used during genetic engineering to produce human insulin.



What is inserted at P so that the bacterium can produce human insulin, and which enzyme is used to catalyse the insertion?

A a section of human DNA, using DNA ligase

B a section of human DNA, using restriction enzymes

C a section of human mRNA, using DNA ligase

D a section of human mRNA, using restriction enzymes

---

28. 0610_s16_qp_21 Q: 38

A gene for insulin is taken from a human cell and placed in a bacterium.

The bacterium can then make human insulin.

What is this process called?

A artificial selection

B genetic engineering

C heterozygous inheritance

D natural selection

---

29. 0610_s16_qp_22 Q: 38

When human DNA is inserted into the plasmid DNA of bacteria, which enzyme is used to cut the DNA?

A DNA ligase

B lipase

C protease

D restriction enzyme

---

30. 0610_w16_qp_21 Q: 37

Which structures, found in bacteria, make them useful in genetic engineering?

A cell walls

B membranes

C plasmids

D mitochondria

---

31. 0610_w16_qp_21 Q: 39

An advantage of some genetically modified crop plants is that they will **not**

A be affected by herbicides.

B need carbon dioxide.

C need magnesium ions.

D need water.

SN	Paper	Q. No.	Answer
01	0610_w16_qp_23	36	C
02	0610_s21_qp_22	39	D
03	0610_w21_qp_21	37	C
04	0610_w21_qp_21	38	A
05	0610_w21_qp_23	38	C
06	0610_p20_qp_20	38	A
07	0610_s20_qp_21	38	B
08	0610_w20_qp_22	38	A
09	0610_w20_qp_23	38	D
10	0610_m19_qp_22	38	B
11	0610_s19_qp_21	38	D
12	0610_s19_qp_23	39	C
13	0610_m18_qp_22	37	C
14	0610_s18_qp_22	37	D
15	0610_s18_qp_22	38	A
16	0610_s18_qp_23	37	A
17	0610_s18_qp_23	38	B
18	0610_w18_qp_21	38	C
19	0610_w18_qp_22	38	D
20	0610_w18_qp_23	37	B
21	0610_w18_qp_23	38	C
22	0610_m17_qp_22	38	D
23	0610_s17_qp_23	38	A
24	0610_w17_qp_21	38	D
25	0610_w17_qp_23	38	A
26	0610_m16_qp_22	39	B
27	0610_p16_qp_20	38	A
28	0610_s16_qp_21	38	B
29	0610_s16_qp_22	38	D
30	0610_w16_qp_21	37	C
31	0610_w16_qp_21	39	A