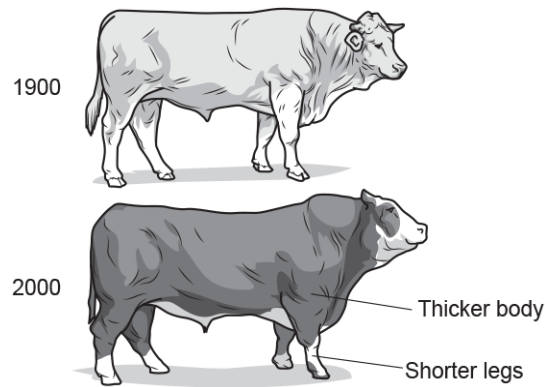


## Feeding the Human Race (F)

1. The drawings show typical cattle kept by farmers in 1900 and in 2000.



Which process would have been used between 1900 and 2000 to produce these changes in the cattle?

- A Artificial classification
- B Biological control
- C Natural selection
- D Selective breeding

Your answer

[1]

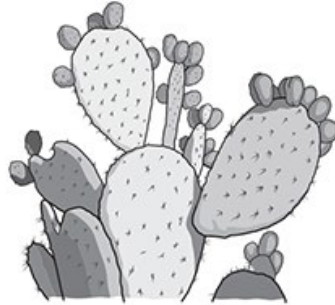
2. Which of these is an **advantage** of using hydroponics for crop production?

- A Fertilisers are not required for crop growth.
- B The crops can be grown in areas where the soil is poor.
- C The crop plants do not need extra support.
- D The crops will not be eaten by pests.

Your answer

[1]

3. The prickly pear is a cactus plant that was introduced into Australia.



The prickly pear cactus spread across the country.

To control the spread of the prickly pear cactus, a caterpillar was released to eat it.

What is the name of this type of control?

- A Biodiversity
- B Biological
- C Mutualism
- D Pesticide

Your answer

[1]

4. Which of these statements is an example of sustainability?

- A. Harvesting selected trees from a forest and replanting.
- B. Replacing forests with food crops.
- C. Taking fish from the sea faster than they can reproduce.
- D. Using crude oil to make plastics.

Your answer

[1]

5. A gardener releases spiders into a greenhouse. They eat the insects which are eating her plants.

What is this an example of?

- A Biological control
- B Gene technology
- C Homeostasis
- D Parasitism

Your answer

[1]

6. In selective breeding which organisms breed?

- A Humans choose which organisms breed.
- B Organisms that are best suited to their environment will breed.
- C Random organisms will breed.
- D The youngest organisms will breed.

Your answer

[1]

7. Plants can be grown in water.

What is the name of this growth method?

- A Active transport
- B Germination
- C Hypothermia
- D Hydroponics

Your answer

[1]

8. Bacteria are used in genetic engineering.

A plasmid is used to transfer the required DNA into the bacterium.

What is the term used to describe role of the plasmid in this technology?

- A. enzyme
- B. host
- C. transgenic
- D. vector

Your answer

[1]

9. Some plants have been genetically engineered so that they grow larger.

Each cell of the plant has a new gene inserted so that it produces a different protein.

What does genetic engineering do to the plant?

- A. It changes the phenotype and the genotype.
- B. It changes the genotype but not the phenotype.
- C. It changes the phenotype but not the genotype.
- D. It changes neither the genotype nor the phenotype.

Your answer

[1]

10. Over the whole world the demand for food to feed humans is increasing.

Describe why is there an increasing demand for food.

-----  
-----

[1]

11 (a). In many countries people rely on bananas for food.

Black sigatoka is a disease of banana plants.

It is caused by a fungus.

Scientists are developing a genetically engineered banana plant.

This would be resistant to black sigatoka.

Look at the newspaper headline from an African newspaper.

**Trouble at the genetic research station**

Police have been called to a research station.  
They are needed to guard the genetically modified plants.  
This is because people have been trying to steal the plants to grow themselves.

In Europe, police have been used to guard genetically engineered crops from protesters.

Suggest why the protesters in Europe want to destroy the crops and why the response in Africa is so different.

-----

-----

-----

[2]

(b). Scientists have tried to predict the effect of climate change on the growth of the fungus.

They have used four different predictions for how the climate might change, **A**, **B**, **C** and **D**.

They then tried different ways of calculating where the fungus cannot grow.

Their results are shown in the table.

Climate model	Percentage area of the world where fungus cannot grow (%)			
	1 <sup>st</sup> calculation	2 <sup>nd</sup> calculation	3 <sup>rd</sup> calculation	4 <sup>th</sup> calculation
<b>A</b>	87.6	87.9	87.7	87.8
<b>B</b>	88.4	88.6	89.0	88.8
<b>C</b>	91.1	91.5	91.4	91.3
<b>D</b>	88.4	88.9	89.5	89.2

- i. Which climate model produces the lowest **range** of results in the four calculations? Choose from **A**, **B**, **C** or **D**.

-----

[1]

- ii. At present the fungus **cannot** grow over 86.4% of the World.

What do the calculations predict about the effect of climate change on the fungus?

-----

[1]

(c). Scientists have been investigating the conditions needed for the fungus to grow.

They compiled this data.

	Conditions needed for fungus to grow	
	Temperature in °C	Percentage humidity (%)
Grows well	25–28	>90
Some growth	20–25 or 28–35	90–80
Will not grow	< 20 or >35	<70

Write in the boxes how well the fungus will grow in these conditions.

25 °C and a humidity of 85%	
27 °C and a humidity of 92%	

[2]

12. This question is about selective breeding.

The table shows the main steps in the process of selective breeding.

They are **not** in the correct order.

<b>A</b>	Repeat the process over many generations.
<b>B</b>	Decide which features are wanted.
<b>C</b>	Choose the individuals that have the features that are wanted.
<b>D</b>	Choose the offspring that have the features that are wanted.
<b>E</b>	Allow the individuals to mate.

Write the letters in the boxes below to give the correct order.

Two have been done for you.

[2]



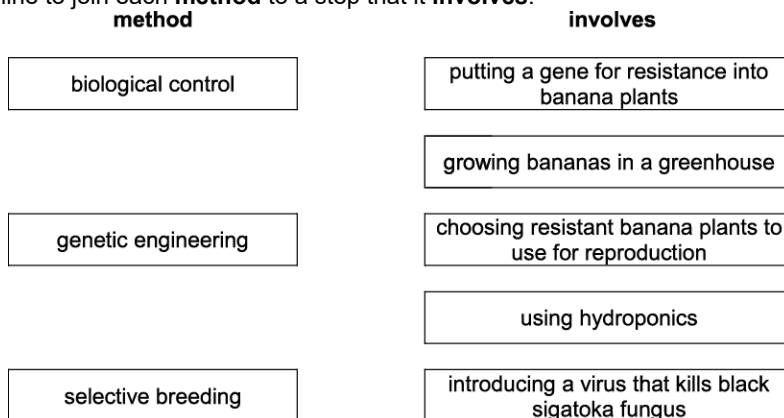
15. In many countries people rely on bananas for food.

Black sigatoka is a disease of banana plants.

It is caused by a fungus.

The food security of bananas could be improved using different methods.

Draw a straight line to join each **method** to a step that it **involves**.



[3]

16. Fig. 16.2 shows a food web containing stevia.

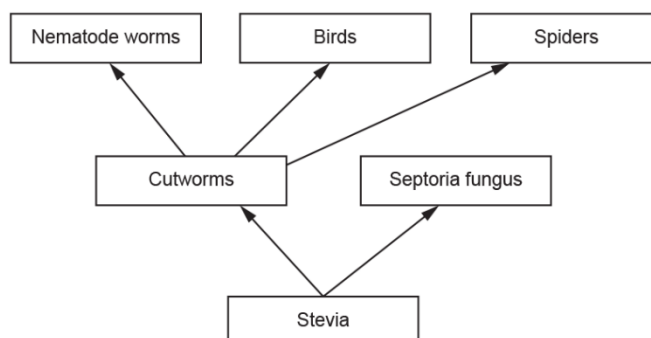


Fig. 16.2

The leaves of stevia taste very sweet. People are now trying to grow stevia as a crop.

Stevia farmers often add nematode worms to their fields.

Explain why farmers do this.

Use Fig. 16.2 in your answer.

-----

-----

-----

-----

-----

-----

-----

-----

-----

-----

[3]



17. This question is about selective breeding.

Cows are female and are used by farmers to produce milk.

Bulls are male.

Look at the details of different varieties of cows and bulls.

Variety	Milk production	Aggressive
Cow A	thin and watery	no
Cow B	medium yield and creamy	no
Cow C	medium yield and creamy	yes
Bull A	mother produced high yield	yes
Bull B	mother produced high yield	no
Bull C	mother produced low yield	no

A farmer wants to produce cows that produce a high yield of creamy milk.

He does **not** want his animals to be aggressive.

Suggest which cow and bull he should choose to mate with each other.

Explain your answer.

cow ..... × bull .....

explanation

-----

-----

-----

-----

-----

[4]



- i. Why did the scientists include the treatments given to block C and block D?

Block C was used so the scientists could

---

---

Block D was used so the scientists could

---

---

[2]

- ii. After a few months the scientists gave the plants in each area a disease rating.  
The higher the rating the more disease present.

block	disease rating
A	20
B	35
C	45
D	60

What conclusions could the scientists make from this study?

---

---

---

---

---

---

[3]

**20.** Over the whole world the demand for food to feed humans is increasing.

Genetic modification (GM) is one method that humans are using to try and produce more food.

- i. What is genetic modification?

---

---

---

[2]

ii. Scientists can use GM to alter the features of crops.

One feature is crop yield.

Suggest **two other** features of crops they could change.

1

-----

2

-----

[2]

iii. In a recent survey **200** people were asked about GM crops.

The people surveyed were shown six statements. Three were negative statements and three were positive statements.

They were asked to choose **one** statement they agreed with.

These are the results.

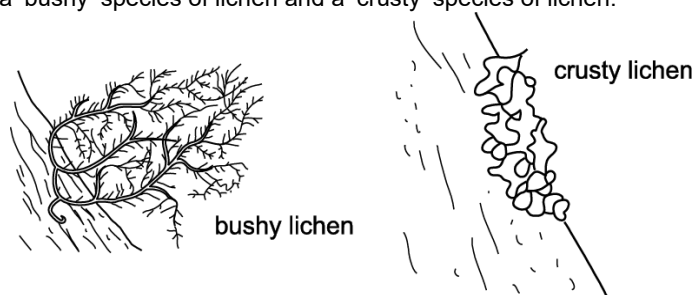
	Statement	Number of people choosing statement
<b>Negative</b>	GM crops are not safe enough to use.	42
	Growing GM crops does more harm than good.	32
	Growing GM crops tampers with nature.	22
<b>Positive</b>	Growing GM crops can prevent people being hungry.	35
	Eating GM crops has very little risk to consumers.	35
	Growing GM crops can make food more nutritious.	34

Calculate the percentage of people in the survey that have a **negative** opinion of genetic modification.

Percentage = ..... % [2]

21. Lichens are sensitive to pollution because they take up chemicals from the air.

The diagram shows a 'bushy' species of lichen and a 'crusty' species of lichen.



Bushy lichens are usually more sensitive to pollution than crusty lichens.

Students decide to use lichens to try and work out how polluted their school grounds are.

They read about a scale called the Lichen Diversity Value (LDV).

It is worked out in this way:

- choose four trees in the area
- hold a quadrat on the north side of the trunk of one tree
- count the total number of all the lichens in the quadrat
- then do this on the east, south and west side of the tree
- repeat this for each tree.

i. Suggest how the students could choose four trees.

-----

----- [1]

ii. The students put their results into a table.

Tree number	Number of individual lichens found in each quadrat			
	North	East	South	West
1	3	11	18	7
2	4	12	17	8
3	5	10	15	12
4	4	15	12	9
mean	4.0	12.0	15.5	

The LDV is found by adding together the four mean values.

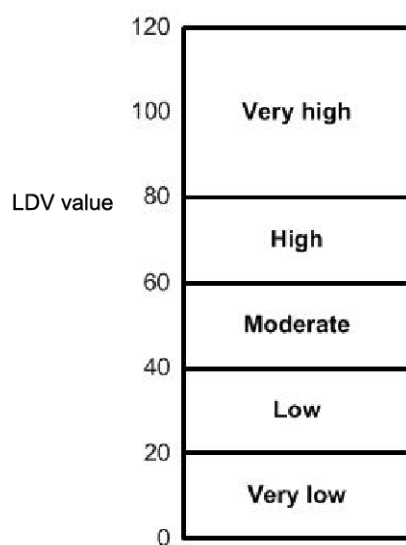
The students calculate the mean number of lichens on the north, east and south sides of the trees.

Calculate the mean for the west side and use this to calculate the LDV.

LDV = .....

[2]

iii. This scale shows the type of diversity shown by the LDV.



What does the LDV show about the amount of diversity in the school grounds?

-----  
-----

[2]

iv. LDV is calculated by counting all the lichens present.

What else about the lichens could the students look for to make a better assessment of pollution?

-----  
-----  
-----  
-----  
-----

[3]

