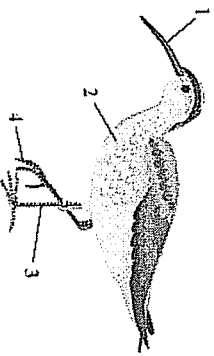


Progress check

Unit B1, B1.4.1

Adaptations

1. The picture shows a bird which lives on sandy beaches. It feeds on animals that burrow into the sand.



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

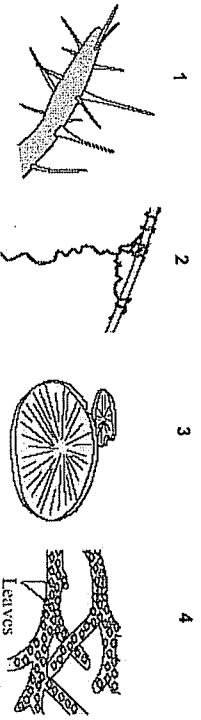
- A wide, to stop the bird from sinking into the sand
- B long, to reach animals buried deep in the sand
- C long, to help the bird to see predators approaching
- D thick, to provide an insulating layer

2. The plants shown in drawings 1 – 4 are adapted in different ways for survival.

Match statements, A, B, C and D, with the drawings 1 – 4.

The plant has leaves adapted . . . layout four items across the page

- A for floating.
- B to deter predators.
- C for climbing.
- D for reducing water loss.



Progress check

Unit B1, B1.4.1

3. Limpets can be found attached to rocks on beaches around Britain.

A group of students on a field trip measured the height and width of 10 limpets on a shore exposed to strong waves, then a further 10 limpets on a very sheltered shore.

The tables show their results.

Limpets from an exposed shore										
1	2	3	4	5	6	7	8	9	10	Mean
Height in cm	1.7	0.9	1.4	1.7	1.2	1.9	1.7	1.2	1.9	0.9
Width in cm	2.4	1.9	2.8	3.1	2.1	2.2	3.1	2.4	3.1	1.9

Limpets from an exposed shore										
1	2	3	4	5	6	7	8	9	10	Mean
Height in cm	1.7	1.4	1.4	2.0	2.3	1.9	2.0	3.2	2.7	3.0
Width in cm	2.8	2.1	2.8	2.3	2.6	1.9	2.5	2.6	2.5	2.9

(a) The students wanted to draw a graph or chart to show all the data.
The best graph or chart to do this would be a . . .

- 1 bar chart.
- 2 line graph.
- 3 pie chart.
- 4 scattergram.

(b) What was the range in height of the limpets from the sheltered shore?

- 1 0.9 to 1.9
- 2 1.4 to 3.2
- 3 1.4 to 2.7
- 4 1.7 to 3.2

(c) The data in the table shows that . . .

- 1 the biggest limpets are the oldest.
- 2 most of the limpets on sheltered shores are taller than those on exposed shores.
- 3 on both shores the tallest limpets are the widest.
- 4 there is more food available to limpets on exposed shores.

(d) From the information given, what is the most likely reason for the difference in the heights of the two populations of limpets?

- 1 On exposed shores waves are likely to dislodge taller limpets.
- 2 There is more food available to limpets on exposed shores.
- 3 There are fewer predators on sheltered shores.
- 4 By random chance students selected older limpets on sheltered shores.

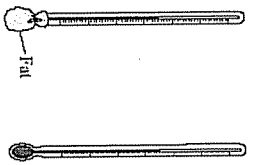
➤ Progress check

Unit B1, B1.4.1

4. A student investigated fat as an insulator.

- he used two thermometers
- he wrapped fat around one thermometer
- the other thermometer had no fat wrapped around it
- he left both thermometers in a freezer set at -20°C .

The drawing shows the two thermometers before being put in the freezer.
The table shows his results.



	Temperature before placing in freezer in $^{\circ}\text{C}$	Temperature after being in freezer in $^{\circ}\text{C}$
Thermometer with no fat	20	-20
Thermometer wrapped in fat	20	7

(a) Which idea was the student testing in this investigation?

- 1 Animals that live in the Arctic are better insulated.
- 2 Fat reduces heat loss.
- 3 The thicker the layer of fat, the better the insulation.
- 4 Animals with fat can survive lower temperatures.

(b) The student wanted to calculate the rate of temperature change of the two thermometers.

To do this, he would also need to measure . . .

- 1 the temperature of the room.
- 2 the mass of the piece of fat.
- 3 the length of time that the thermometers were in the freezer.
- 4 the temperature of the freezer.

(c) A scientist decided to investigate whether there was a link between where polar bears live and the thickness of their body fat.

To obtain reliable results, the scientist should survey . . .

- 1 polar bears of the same age.
- 2 polar bears and brown bears.
- 3 only polar bears living in the coldest temperatures.
- 4 polar bears at different times of the year.

(d) Which one of the following would you expect the scientist to find in this survey?

- 1 There is no link between thickness of body fat and environmental temperature.
- 2 Lower environmental temperatures cause polar bears to put on weight.
- 3 The colder the environmental temperature, the thicker the layer of fat.
- 4 The warmer the environmental temperature, the thicker the layer of fat.

➤ Progress check

Unit B1, B1.4.1

5. Students investigated competition between cress seedlings.

- Five dishes of different widths were filled with soil to the same depth.
- Six cress seeds were planted, evenly spread out, in each dish.
- The dishes were kept in the same place in a laboratory and the seedlings were watered with the same amount of nutrient solution each day.

The height of each cress seedling was measured after ten days. The results are shown in the table.

Width of dish in cm	7.8	7.3	7.6	7.2	8.0	7.7	Mean height of cress seedlings in cm
5	7.8	7.3	7.6	7.2	8.0	7.7	7.6
10	7.0	7.0	7.1	6.9	6.9	7.1	7.0
15	6.5	6.7	6.9	6.7	6.6	6.7	6.7
20	6.6	6.3	6.6	6.4	6.5	6.4	6.4
25	6.1	5.9	6.0	6.3	6.1	6.2	6.1

(a) Why was the same number of cress seeds planted in each dish?

- 1 so that the results would be accurate
- 2 in order to calculate a mean
- 3 to make the experiment a fair test
- 4 so that the seeds would not be overcrowded

(b) In which dish was there the greatest range of seedling heights?

- 1 5 cm dish
- 2 10 cm dish
- 3 15 cm dish
- 4 20 cm dish

(c) Which pattern is supported by the data in the table?

- 1 The wider the dish, the taller the cress plants.
- 2 The narrower the dish, the greater the mass of the cress plants.
- 3 The narrower the dish, the shorter the cress plants.
- 4 The narrower the dish, the taller the cress plants.

(d) The main reason for the differences in the mean heights of the seedlings was competition for . . .

- 1 light.
- 2 nutrients.
- 3 space.
- 4 water.

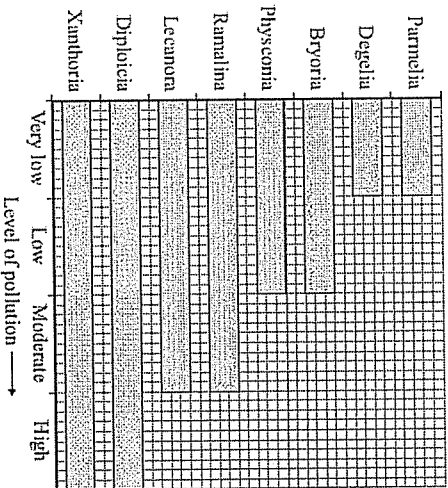
Environmental change

1. Organisms are adapted for survival in many different ways. Match adaptations, A, B, C and D, with the numbers 1–4 in the table.

- A leaves are poisonous
B leaves have prickles
C blue skin with yellow spots
D white colour

	How adaptation helps survival
1	camouflages an animal in the Arctic
2	warns birds not to eat it
3	hurts the mouth of animals that try to eat it
4	makes animals that eat it ill

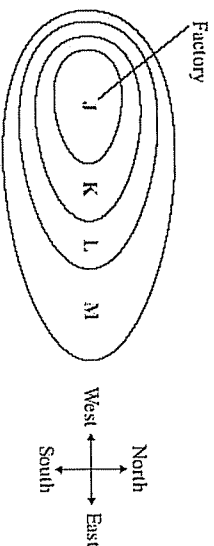
2. The chart shows how much pollution different lichens can tolerate.



- (a) Which of the following lichens is most sensitive to pollution?

- 1 Degelia
2 Diploicia
3 Physconia
4 Ramalina

The diagram shows the distribution of lichens around a factory which burns coal.



- (b) In which direction does the wind blow the pollution?

- 1 towards the north
2 towards the east
3 towards the south
4 towards the west

- (c) Which row in the table shows a correct distribution of lichens?

	Lichen in area J	Lichen in area K	Lichen in area L	Lichen in area M
1	Xanthoria	Diploicia	Parmelia	Ramalina
2	Ramalina	Degelia	Bryoria	Physconia
3	Degelia	Bryoria	Lecanora	Xanthoria
4	Xanthoria	Lecanora	Bryoria	Parmelia

- (d) Lichens can be used to estimate levels of pollution from ...

- 1 carbon dioxide.
2 methane.
3 pesticides.
4 sulfur dioxide.

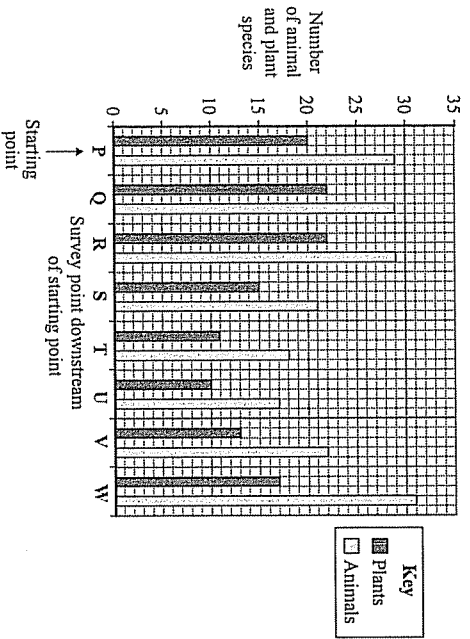
3. In each part choose only one answer.

This question is about indicator species.

- A Which one of the following is not a definition of an indicator species?

- 1 a species of animal or plant that may show a change in population due to environmental change
2 a species of animal or plant that may show a change in population due to pollution
3 a species whose population may fall in response to damage to the environment
4 a species of animal or plant whose population is affected only by changes in the population of another species

The bar chart shows the results of a survey into the water quality of a river.



B Which part of the river is most likely to contain a source of pollution?

- 1 at R
- 2 between R and S
- 3 at S
- 4 between S and T

C Which row in the table is correct?

	Change in the number of plant species between points P and W	Change in the number of animal species between points P and W
1	-2	-2
2	+2	-3
3	-3	+2
4	+3	-3

D How could the results have been made more reliable?

- 1 repeating the survey at each point on the river
- 2 sampling more points on the river above starting point P
- 3 calculating the mean number of plants and animals at each point on the river
- 4 increasing the distance between each point

4. In each part choose only one answer.

Professor John Lawton researches into the problem of controlling the spread of bracken. He is waiting for government permission to release the *Conservular* caterpillar which feeds on the bracken. The Secretary of State has to decide whether the *Conservular* caterpillar can be released. The article printed below describes some of the problems faced by the Secretary of State.

David the caterpillar to bracken's Galinith

Bracken is one of the most widespread and dangerous weeds known to man. Professor Lawton is researching a new method of controlling bracken with *Conservular* caterpillars which could have done the job for nothing. His research has shown that bracken is the caterpillar's only food. However, can scientists predict what will happen when insects are released into the wild? Bracken is poisonous – more than 20 000 sheep and 1000 cattle are poisoned by it each year. Its spores can cause hill walkers to develop cancer. Bracken cost £4 m a year to control. It destroys grazing land worth £5 m each year. The National Farmers Union is concerned about the caterpillar getting out of control. What if it started eating potatoes? However, the caterpillar might help to preserve important habitats for rare animals and plants. World-wide, scientists are trying to control 94 species of weeds by using insects. Professor Lawson says that there is good control in approximately one-third of these cases.

A A student performs an experiment to find whether caterpillars prefer eating garden ferns to bracken. What would be the independent variable in this experiment?

- 1 the amount of plant eaten
- 2 the number of caterpillars
- 3 the number of plants
- 4 the types of plant

B How could the validity of the experiment be improved?

- 1 by increasing the number of caterpillars and the number of plants
- 2 by increasing the number of plants of each type
- 3 by increasing the number of types of caterpillar
- 4 by increasing the number of types of plant

C The Secretary of State might decide not to allow the caterpillar to be released. One reason for this could be that . . .

- 1 it would cost too much money.
- 2 it would upset the National Farmers Union.
- 3 it would upset the Ramblers Association.
- 4 there is insufficient scientific evidence about the effects of releasing the caterpillar.

➤ Progress check

Unit B1, B1.4.2

- D What will be the effect on hill farms if the Secretary of State decides that the caterpillar should not be released?
- 1 Hill farms will become less profitable.
 - 2 More ramblers will use the countryside.
 - 3 Some hill farms will be turned into forests.
 - 4 There will be more grazing land for sheep on hill farms.