Unit 3 Life on Earth Revision Questions

Key Area 5 Food Production

1. Pesticides sprayed onto crops can get into food chains. The following statements refer to stages in this process.

J Pesticides are absorbed by plants.

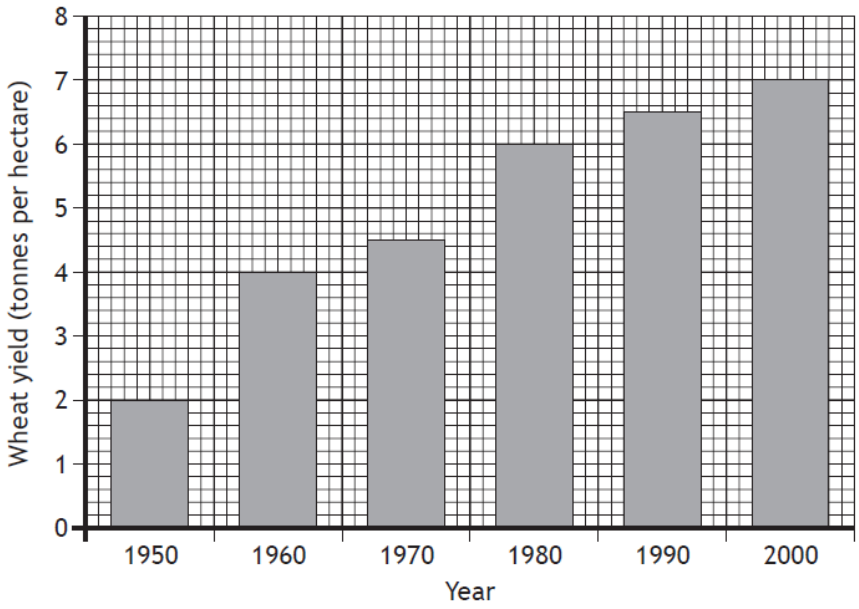
K Pesticides build up in animals.

L Plants are eaten by animals.

Identify the order of steps by which pesticides could reach lethal levels in the bodies of animals.

	Step 1	*Step 2*	*Step 3*
A	J	K	L
B	L	J	K
C	L	K	J
D	J	L	K

2. The following graph shows the changes in wheat yield over a fifty-year period.



The percentage increase in wheat yield from 1950 to 2000 is

A 5

B 40

C 250

D 350.

3. DDT can be sprayed onto crops to kill insects. It can be washed off the crops by rainwater and flow into rivers where it accumulates in food chains.

A typical freshwater food chain and the concentration of DDT in each organism is shown below.

Food chain:	algae ⟶	stickleback ⟶	trout ⟶	osprey
DDT concentration:	0·001	2·0	5·0	20·0

The percentage increase in DDT concentration between the trout and osprey is

A 15

B 100

C 300

D 400.

4. Which of the following statements describes the sequence of events when fertiliser leaches into a loch?

A Algal bloom develops ⟶ algae die ⟶ oxygen concentration increases

B Algal bloom develops ⟶ algae die ⟶ oxygen concentration decreases

C Oxygen concentration increases ⟶ algal bloom develops ⟶ algae die

D Algae die ⟶ oxygen concentration decreases ⟶ algal bloom develops

5. A gardener treated the soil in the area where he planted vegetables with a chemical to increase the yield.

(a) (i) The chemical added to the soil by the gardener contained nitrates.

Give the general name for this type of chemical. 1

_____

(ii) Describe the use that plants make of nitrates. 1

_____

(iii) When the vegetables were picked and weighed, the total yield was 42 kilograms. The previous year the total yield was 35 kilograms.

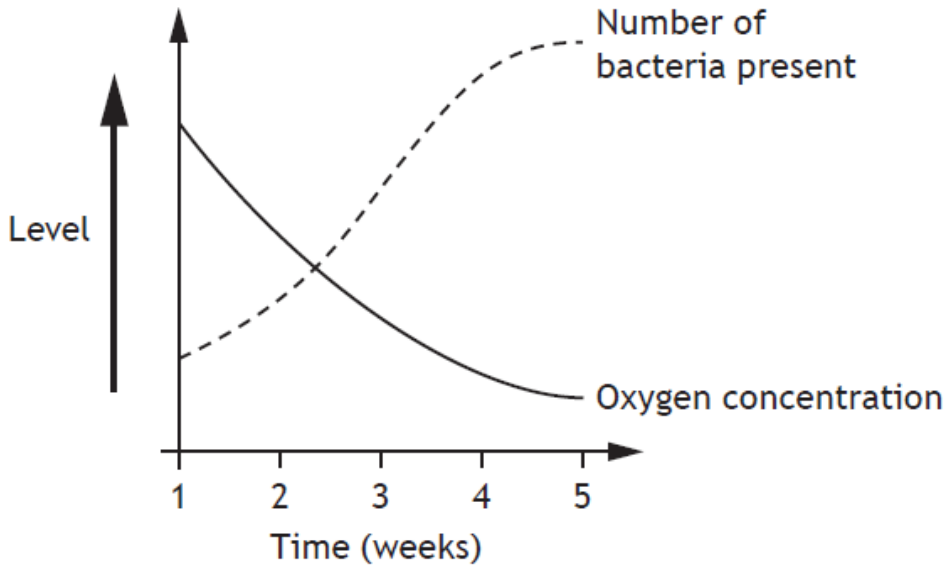
Calculate the percentage increase in yield. 1

Space for calculation

_____%

(b) Later in the year the gardener noticed that the algae in his pond had increased and now covered the surface of the water. He sampled the pond water over 5 weeks and measured its oxygen concentration and number of bacteria present.

The results are shown in the graph.



(i) What name is given to the increased growth of algae in the pond? **1**

_____

(ii) Explain why the increased growth of algae resulted in an increase in the number of bacteria. **1**

_____

_____

(iii) Using the information in the graph, explain why the increase in number of bacteria resulted in the population of goldfish in the pond decreasing. **1**

_____

_____

6. Fresh water environments, such as Lake Malawi, can be affected by the overuse of fertilisers. This can impact on the organisms living in these environments.

The following statements show how this might occur, but not in the correct order.

1. Chemicals leach into water
2. Fish die
3. Overuse of fertilisers
4. Oxygen levels decrease
5. Algal bloom develops

Place a statement number in each box to complete the sequence of events. 1

7. The number of farmland birds in Europe has decreased dramatically in recent years. A study estimated that the total bird population has dropped from 600 million to 300 million between 1980 and 2009.

It has been suggested that the use of pesticides may have killed many of the insects that are eaten by bird species.

The effect on the populations of some bird species is shown in the table.

Bird species	*Population in 1980* (millions)	*Population in 2009* (millions)	*Population decrease* (%)
Linnet	37·0	14·0	62
Meadow pipit	34·9	12·9	63
Corn bunting	27·2	9·2	66
Starling	84·9	39·9	53
Whinchat	10·4	3·4	67
Yellow wagtail	9·4	4·4	53

(a) Explain why the population decrease was expressed as a percentage rather than a decrease in number. 1

_____

_____

7 (continued)

(b) Using information from **the passage and the table**, calculate the percentage of Meadow pipit in the total bird population in 2009. **1**

Space for calculation

_____ %

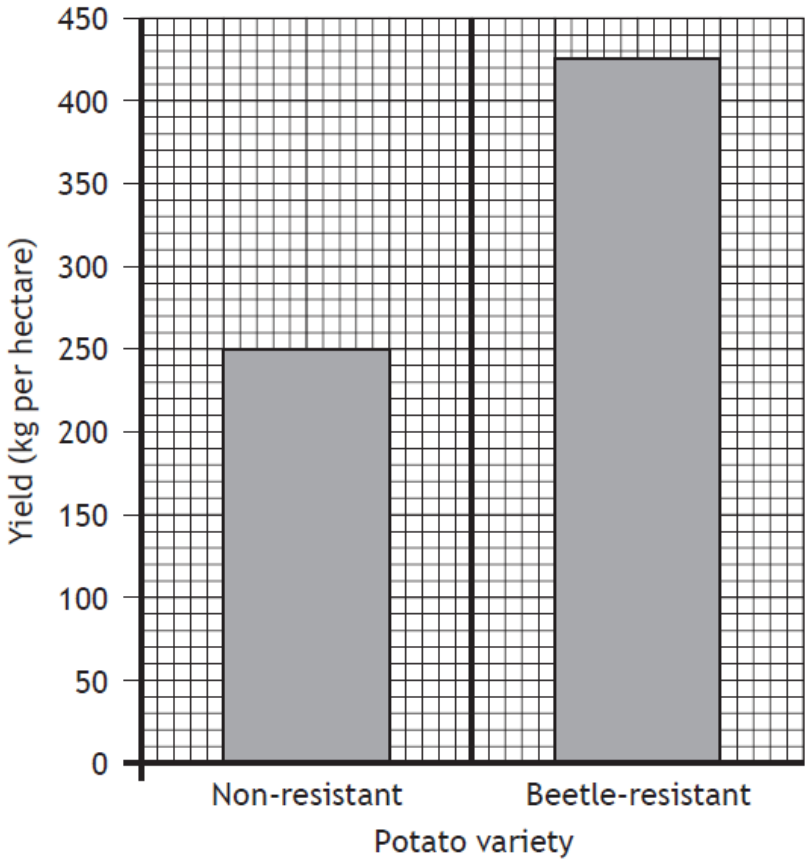
(c) Identify the two species of birds which were least affected between 1980 and 2009. **1**

_____ and _____

8. Certain varieties of potato plant are eaten by beetles, reducing the yield of potatoes. A beetle-resistant variety of potato plant was developed.

In an investigation, the beetle-resistant variety was grown outdoors in one field and the non-resistant variety grown in another.

The yields of both varieties were recorded and the results are shown in the graph below.



8 (continued)

(a) Describe how the reliability of these results could be increased. 1

_____

_____

(b) Calculate the difference in yield between the two varieties. 1

Space for calculation

_____ kg per hectare

(c) Identify a variable that would have to be kept the same between the two fields to ensure the results were valid. 1

_____

(d) Genetic engineering was used to develop the beetle-resistant variety of potato plant.

Before the development of genetic engineering, farmers used other methods to control the beetle numbers in their potato fields.

Name **one** of these methods. 1

_____

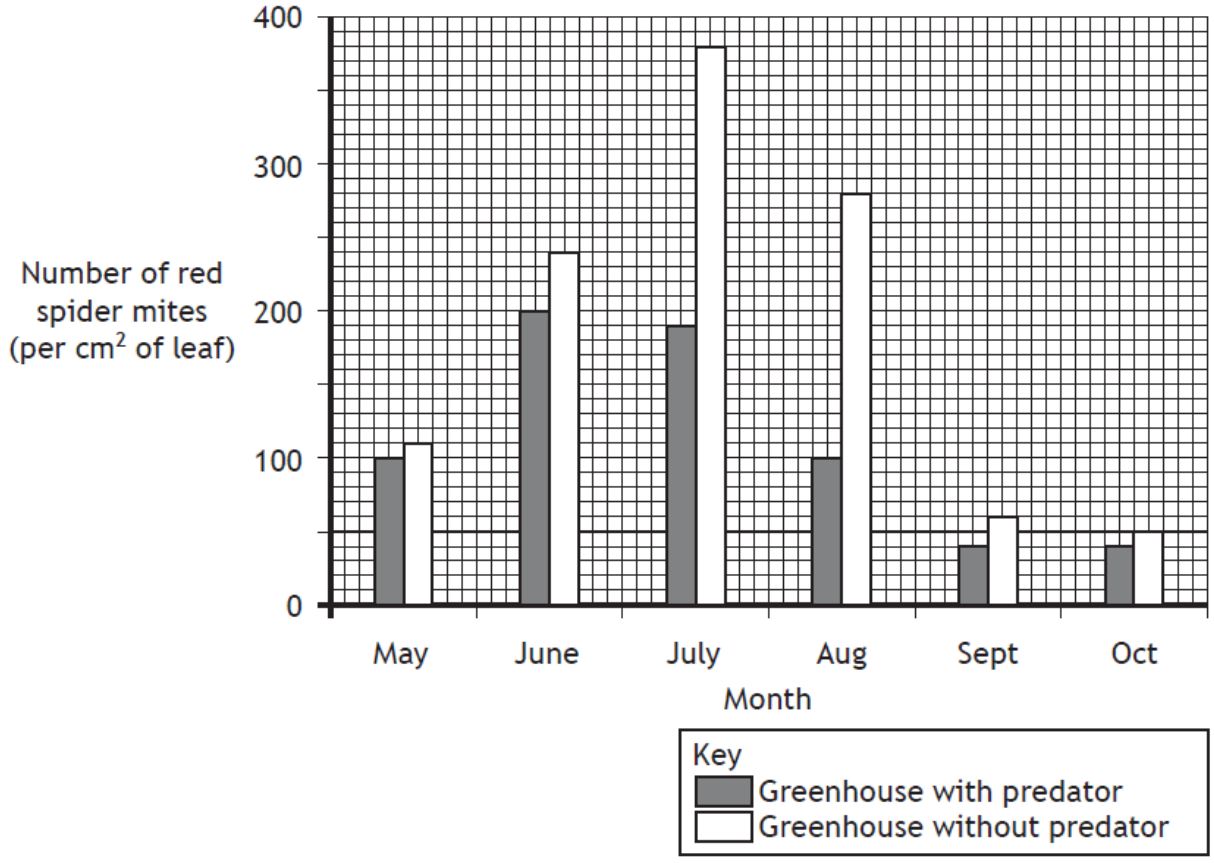
9.

Red spider mites are a common pest which destroy tomato plants. Some of the mites are resistant to chemical pesticides.

Tomato growers aimed to investigate whether a predator would reduce the spider mite numbers in their greenhouses. Two identical greenhouses were used and the predator was released into only one greenhouse.

9 (continued)

The results are shown in the graph below.



(a) (i) With reference to the aim of this investigation, give the conclusion that the tomato growers would have drawn from these results. **1**

_____

_____

(ii) The greenhouse containing tomato plants without predators was included as a control experiment.

State the purpose of the control in this investigation. **1**

_____

_____

(b) State the term which describes the use of a predator as an alternative to pesticides. **1**

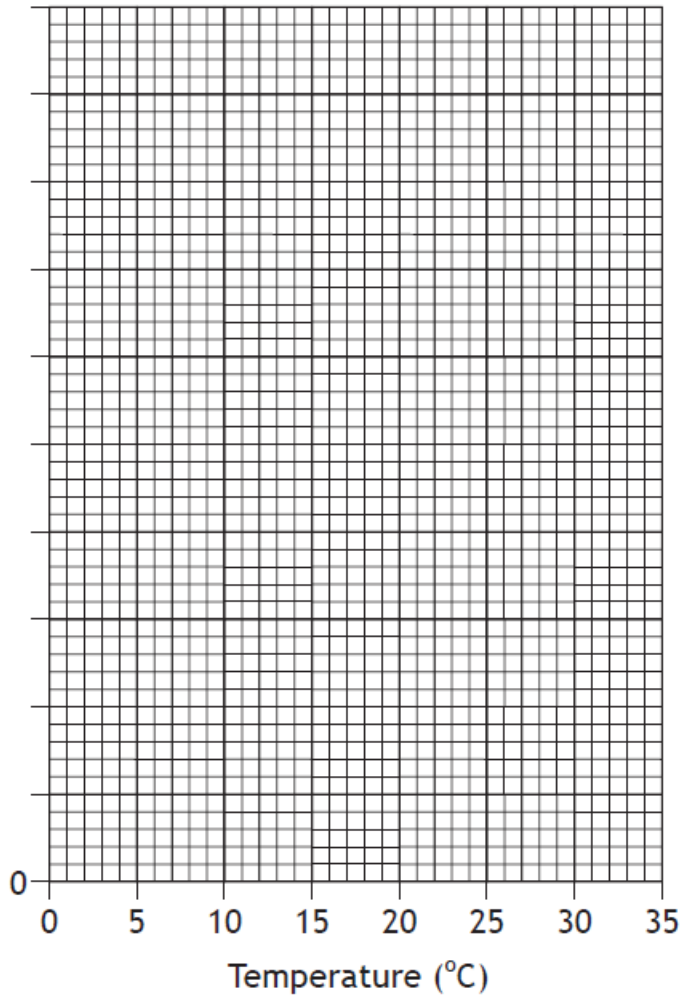
_____

10. (a) An experiment was set up to find out the optimum temperature for the growth of tomatoes in a glasshouse. The following table gives the results of this experiment.

Temperature (°C)	*Fresh mass of tomatoes* (g/plant)	*Dry mass of tomatoes* (g/plant)
14	1000	50
18	8300	415
22	9000	450
26	2200	110
32	1600	80

(i) On the grid below, complete the vertical axis and plot a line graph to show the effect of temperature on the dry mass of tomatoes. 2

(Additional graph paper, if required, can be found on *Page twenty-three*)



10 (continued)

(ii) Above 26 °C the drop in the fresh mass of tomatoes continues at a steady rate.

Using the information in the table, predict the fresh mass of tomatoes which will be produced at 35 °C. 1

Space for calculation

_____ g/plant