Read through the text and have a go at the questions. When you are done, use the mark scheme to check back your answers. If there are you feel unsure about and would like to discuss, try writing about it in your note when you submit.

This text is about how ladybirds helped farmers in California to get rid of a plague of tiny insects that were killing their orange trees.

California's Unlikely Warriors

Over 100 years ago in America, Californian orchards were almost destroyed by a plague of thousands of tiny creatures called scale insects. These tiny sap-sucking bugs were attacking the orange trees and ruining all the fruit.

Scale insects had never been seen in America before. So where had they come from? Eventually the invasion was traced to some acacia plants that had been shipped in from Australia.

The scale insects spread so quickly that unless something was done to get rid of them, the whole fruit industry in California would be ruined. The situation was so bad that Californian fruit growers were pulling up their fruit trees and burning them to destroy the pests. Soon, the takeover started to spread to other parts of America. Different kinds of pesticides were used to try to kill the insects but none of them worked.

By now thousands of orange trees were dying.

A professor from the Department of Agriculture, Charles V. Riley, suggested that the scale insects might be controlled by introducing other insects to feed on them. But no-one listened to him. No-one had ever heard such a theory before! They thought it was a crazy idea and laughed at his suggestion. This made Mr Riley more determined. He was sure that he was right.

He had heard that in Australia, scale insects were much less of a problem. So, why was this? Why were the Australians not suffering the same damage to their trees and plants?

Mr Riley predicted that the Australian scale insects must have a natural enemy that was reducing their numbers. Eventually he was able to persuade a researcher called Alfred Koebele to go to Australia to try to find out if this was the case.

In Australia, Mr Koebele visited many of the trees that attracted scale insects and made a surprising discovery – a large number of small colourful beetles were living in them. They were ladybirds, and everywhere he found scale insects on the fruit trees of Australia, he found ladybirds feasting on them. Mr Koebele scooped up as many of the little red and black creatures as he could and sent them back to California.

When the unlikely warriors were set free in one of the dying Californian orange groves, they cleared all the scale insects from the trees in just a few days. The original 350 ladybirds sent from Australia multiplied at such a staggering rate that by June that year over 10,000 were available to be distributed to fruit growers across California. The speed at which the pests were wiped out was astonishing. One grower, who had abandoned all hope for his young orange trees, was able to harvest two to three boxes of oranges from each tree by the end of the growing season.

So successful was the experiment that soon the Americans were breeding and distributing more and more ladybirds. Not only that, but before long other countries around the world also decided to import and breed Australian ladybirds.

Because of this remarkable result, we now know a lot more about these ladybirds. We know that scale insects are their favourite food and that some ladybirds can eat large amounts in a day. Ladybirds also like to eat honeydew, nectar and pollen – but they still need insects to help them grow and breed.

Today, scientists are still studying ways of using insects to help control the pests and parasites that regularly destroy our plants and trees. As we learn about some of the damage that chemical pesticides can cause, it seems even more important to take care of small creatures that can help us protect our environment.

There is an old superstition which says that ladybirds bring you luck. They certainly brought good fortune to the fruit growers of California!

1. How long ago did the plague of scale insects attack in America?

_____

1 mark

2. What did the scale insects attack?

_____

1 mark

3. The scale insects sound like an army.

Find and **copy two** words in the first two paragraphs that support this idea.

1. _____

2. _____

2 marks

4. It was important to find a solution to the plague of insects quickly.

Explain why.

_____

_____

_____

1 mark

5. Before ladybirds were introduced, how did the fruit growers try to solve the problem of scale insects?

_____

_____

1 mark

6. Look at page 1.

1. What did Mr Riley suggest to solve the problem of scale insects?

_____

1 mark

2. How did other people react to Mr Riley's suggestion?

_____

1 mark

7. In the paragraph beginning: *In Australia, Mr Koebele visited*…, the ladybirds are described as *feasting* on the scale insects.

What does the word *feasting* suggest about the ladybirds?

_____

_____

1 mark

8. Look at the paragraph on page 2 beginning:

When the unlikely warriors...

How does the text emphasise the success of the ladybirds?

Explain fully, referring to the text in your answer.

_____

_____

_____

_____

_____

_____

_____

_____

3 marks

9. Tick one box in each row to show whether each statement about ladybirds is **true** or **false**.

	True	**False**
They help protect the environment.		
They only eat scale insects.		
They can survive on just nectar and pollen.		

Some people say that they bring you good luck.		