**Plant disease detective**

**Technical & Teaching Notes**

### ****Introduction and context****

### **Ideas about communicable diseases in plants are included in the updated programmes of study for Key Stage 4 science published in December 2014. These ideas will be included in GCSE Science courses from 2016 (for first assessment in summer 2018).**

### **In this activity students act as detectives, piecing together information from the sources provided to identify common plant diseases, including the type of pathogen causing it, ways in which the disease is spread, and how to stop the spread.**

### **The activity will help students to demonstrate the following learning outcomes at KS4:**

### **describe common plant diseases**

### **explain how these communicable plant disease are spread.**

### Teaching Notes

### **There is no student activity sheet, but students should be provided with copies of the ‘Case notes’ sheets at the end of this document. Alternatively, to save on photocopying, the ‘Evidence’ section of the ‘Case notes’ could be displayed/projected at the front of the class and students instructed to write up their notes on blank paper.**

### **The students’ task is to use the ‘Evidence’ and the information in one or more ‘sources’ to identify each disease, the type of pathogen causing it, and the likely route by which the infection was spread, and how to stop it spreading to other plants.**

### **Students should be provided with copies of (or online access to) sources containing information about pathogens, spread and control, for example:**

### ***British Society for Plant Pathology* information sheets available at:** <http://www.bspp.org.uk/outreach/article.php?id=100>

### ***Royal Horticultural Society* advice pages at:** <https://www.rhs.org.uk/advice/plant-problems/diseases-disorders>

### **new GCSE textbooks.**

### **Note:**

### **Case 1 is ash dieback**

### **Case 2 is tobacco mosaic virus**

### **Case 3 is crown gall disease**

### **Case 4 is powdery mildew**

### **Case 5 is rose black spot.**

### **You may wish to limit the activity to the plant diseases named in the particular GCSE Biology specification you are teaching. Different GCSE Biology specifications require students to describe different plant diseases, as follows:**

### ****AQA:** tobacco mosaic virus, rose black spot**

### ****Edexcel:** ash dieback**

### ****OCR Gateway:** tobacco mosaic virus, barley powdery mildew, crown gall disease (*Agrobacterium tumefaciens*)**

### ****OCR Twenty First Century Science:** tobacco mosaic virus, ash dieback, crown gall disease (*Agrobacterium tumefaciens*)**

**Acknowledgements**

### **This activity was developed by Alistair Moore at the *University of York Science Education Group* (**[www.uyseg.org](http://www.uyseg.org)**).**

CASE NOTES

Case 1 (opened 26th August)

EVIDENCE

Dog walkers in Lockhart Wood have reported seeing black patches on the leaves of trees. Seems to be limited to ash trees. Some leaves are wilting and dying. A number of trees also have dark patches on their trunks.

CONCLUSIONS

SUSPECTED DISEASE:

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TYPE OF PATHOGEN\*: VIRUS / BACTERIUM / FUNGUS

\*circle correct option

HOW IT IS SPREAD:

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RECOMMENDATIONS

ACTIONS THAT WILL HELP TO LIMIT THE SPREAD:

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CASE NOTES

Case 2 (opened 29th September)

EVIDENCE

Mr Moore is very disappointed with his tomatoes this year. The plants are short and stunted, and the yield of fruit is low. Some of the leaves have a mosaic pattern of dark spots on their leaves.

CONCLUSIONS

SUSPECTED DISEASE:

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TYPE OF PATHOGEN\*: VIRUS / BACTERIUM / FUNGUS

\*circle correct option

HOW IT IS SPREAD:

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RECOMMENDATIONS

ACTIONS THAT WILL HELP TO LIMIT THE SPREAD:

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CASE NOTES

Case 3 (opened 2nd February)

EVIDENCE

Mrs Tonry is concerned about her apple trees. Many of them have small white lumps on their bark. A few have much larger, hard, malformed growths on their trunks.

CONCLUSIONS

SUSPECTED DISEASE:

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TYPE OF PATHOGEN\*: VIRUS / BACTERIUM / FUNGUS

\*circle correct option

HOW IT IS SPREAD:

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RECOMMENDATIONS

ACTIONS THAT WILL HELP TO LIMIT THE SPREAD:

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CASE NOTES

Case 4 (opened 22nd July)

EVIDENCE

Farmer Pattison has said he may not be able to harvest his barley this year. He has noticed a white, powdery substance on the upper and lower surfaces of the leaves. He is worried that it might be an infection.

CONCLUSIONS

SUSPECTED DISEASE:

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TYPE OF PATHOGEN\*: VIRUS / BACTERIUM / FUNGUS

\*circle correct option

HOW IT IS SPREAD:

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RECOMMENDATIONS

ACTIONS THAT WILL HELP TO LIMIT THE SPREAD:

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CASE NOTES

Case 5 (opened 15th May)

EVIDENCE

Students at Mowbray High School have found dark patches on the leaves of rose bushes in the school grounds. The patches are on the upper surface of the leaves. Some of the leaves are turning yellow around the patches.

CONCLUSIONS

SUSPECTED DISEASE:

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TYPE OF PATHOGEN\*: VIRUS / BACTERIUM / FUNGUS

\*circle correct option

HOW IT IS SPREAD:

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RECOMMENDATIONS

ACTIONS THAT WILL HELP TO LIMIT THE SPREAD:

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