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**Year 10 – Student Booklet A (Triple)**

Key Stage 4 Science:

**Infection & Response**

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**This booklet is for use in your Science lessons. Please look after it in the same way you would your exercise book and ensure that your presentation is always PROUD.**

**Ensure that your booklet is returned to your class book box at the end of the lesson.**

**Lesson Breakdown**

Lesson 1: 4.3.1.1 Communicable diseases

Lesson 2: 4.3.1.2 – 4.3.1.4 Viral diseases, bacterial diseases, fungal diseases

Lesson 3: 4.3.1.2 – 4.3.1.4 Viral diseases, bacterial diseases, fungal diseases

Lesson 4: 4.3.1.5 Protist diseases (including malaria)

**Lesson 5 (HT only): 4.3.3.1** **Detecting and identification of plant diseases**

**Lesson 6: 4.3.3.1 Plant defence responses**

Lesson 7: 4.3.1.6 Human defence systems (barriers and symptoms)

Lesson 8: 4.3.1.6 Human defence systems (white blood cells)

Lesson 9: 4.3.1.7 Vaccination

Lesson 10: 4.3.1.8 Antibiotics and painkillers

Lesson 11: 4.3.1.9 Discovery and development of drugs

Lesson 12: 4.3.1.9 Discovery and development of drugs (placebo effects,

double blind trials etc).

**Lesson 13 (HT only): 4.3.2.1 Producing monoclonal antibodies**

**Lesson 14 (HT only): 4.3.2.1 Uses of monoclonal antibodies**

**Keystone words**

Microorganism

Communicable

Pathogen

Vector

Response

Infection

Resistance

Immune

**Knowledge Test Tracker**

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| **Lesson** | **Marks achieved** | **Percentage** |
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**Lesson 1: Communicable Disease**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Objective: By the end of this lesson, you will be able to define ‘communicable disease’ and explain how they are transmitted.**

**Skills Drill / Retrieval**

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**Connect**

In the Organisation topic you studied examples of non-communicable diseases (CHD and cancer).

1. **Which organ is affected by CHD?**

Coronary Heart Disease affects the heart

1. **What causes CHD?**

In coronary heart disease layers of fatty material build up inside the coronary arteries, narrowing them. This reduces the flow of blood through the coronary arteries, resulting in a lack of oxygen for the heart muscle.

1. **In what three ways can CHD be treated?**
2. Stents are used to keep the coronary arteries open.
3. Statins are widely used to reduce blood cholesterol levels which slows down the rate of fatty material deposit.
4. Lifestyle changes.
5. **Classify each disease as communicable, non-communicable or both using the Venn diagram.**

**2. There were almost 24 million cases of SARS-CoV-2 (Covid) during the pandemic in the 2020’s. These resulted in over 200,000 deaths and caused global disruption.**

1. **Was SARS-CoV-2 transmitted through airborne droplets, water supply or by direct contact?**

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1. **List three measures that the government took to reduce the rate of transmission.**

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1. **Pick one measure that the government took and explain how it prevented or reduced transmission of SARS-CoV-2.**

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**Influenza Measles Asthma SARS-CoV-2 Diabetes HIV Tobacco mosaic virus Cholera Rose black spot Arthritis Malaria**

**Both**

**Non-communicable**

**Communicable**

**3. JOHN SNOW'S THEORY OF HOW CHOLERA SPREAD**

A person sitting in a chair

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14. He eventually convinced local officials to remove the handle of the pump, although by that time the

15. worst of the epidemic had actually passed. It was later established that a leaking sewer ran near the

16. well from which the water was drawn.

17. Unfortunately, Snow failed to convince many in the medical establishment of his theory, including

18. William Farr, who was responsible for medical statistics at the General Register Office. Farr took part

19. in the General Board of Health's 1854 Committee for Scientific Enquiries on the cholera outbreak but

20. although they accepted Snow's data, they dismissed his theory that the mode of transmission for

21. cholera was waterborne.

22. Farr was finally converted to Snow's theory in the wake of the final London cholera epidemic of

23. 1866.  He produced a monograph which showed that mortality was extremely high for people who 24. drew their water from the Old Ford Reservoir in East London. Farr's work was then considered

25. conclusive.

1. **Is Cholera transmitted through the airborne droplets, through water or by direct contact?**

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1. **What evidence did John Snow have to show how Cholera was transmitted?**

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1. **How could the transmission of Cholera be controlled if John Snow was correct?**

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1. In 1848–49 there was a second outbreak of cholera, and this was
2. followed by a further outbreak in 1853–54. Towards the end of the
3. second outbreak, John Snow, a London-based physician, published
4. a paper, On the Mode of Communication of Cholera (1849), in
5. which he proposed that cholera was not transmitted by bad air but
6. by a water-borne infection. However, little attention was paid to the
7. paper.
8. Following the third cholera outbreak in 1854, Snow published an
9. update to his theory, with statistical evidence that he had collected
10. from an area of London around Broad Street, Soho. By recording
11. the location of deaths related to cholera in the area, Snow was able
12. to show that the majority were clustered around one particular
13. public water pump in Broad Street.

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**4. Pathogens**

**a. Name four types of pathogen.**

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**b. Name one example of a communicable disease caused by each type of pathogen.**

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**c. Compare bacterial and viral pathogens and how they make us feel ill.**

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**d. Scientists have been tracking an outbreak of a new form of Ebola. It is has a high transmission rate and is thought to be spread by direct contact with blood and other body fluids. It is also thought to be waterborne because it is more stable that wild-type Ebola.**

**The prime minister has asked you to advise him on how to control the outbreak.**

* **List the measures that you would advise the prime minister to take.**
* **Explain why each measure would reduce the rate of transmission.**

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**Lesson 2: Viral Diseases**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Skills Drill / Retrieval**

**Objective: By the end of this lesson, you will be able to describe how communicable diseases caused by viruses affect the host and how their transmission can be reduced.**

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**Connect**

1. **Viruses reproduce inside cells. Describe the reproductive cycle of a virus.**

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1. **HIV**
2. How is HIV transmitted?
3. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
4. Which part of the body does HIV attack?

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1. How is HIV different to AIDS?

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1. **Measles**
2. How is measles transmitted?

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1. Name two symptoms of measles.

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1. **Tobacco Mosaic Virus**

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Activity 5.

1. The first case of HIV occurred in 1959 in a Congolese man. The AIDS epidemic
2. officially started in 1981. Between 1959 there were numerous cases of HIV
3. detected but they occurred in isolated clusters.
4. Very little was known about the disease and how it was transmitted at the start of
5. the epidemic. However, it was known that the AIDS was common in addicts that
6. injected drugs and sex workers.
7. Use this information to suggest measures that the government should have taken
8. to control or reduce transmission of the disease.

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**Notes**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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10. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
16. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
17. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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21. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
22. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
23. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
24. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
25. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
26. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
27. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
28. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
29. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
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33. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
34. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
35. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
36. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
37. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
38. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lesson 3: Bacterial and Fungal Diseases**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Objective: By the end of this lesson, you will be able to describe how communicable diseases caused by bacteria and fungi affect the host and how their transmission might be reduced.**

**Skills Drill / Retrieval**

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| Answer | | PA / SA |
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**Connect**

Viruses are one of the types of pathogens that can cause communicable diseases.

Compare the structure of a virus to the structure of a bacterial cell.

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**Graphical user interface

Description automatically generated**

Text

Description automatically generated with medium confidence

Graphical user interface, website

Description automatically generated with medium confidence

1. On December 3, 1988, Edwina Currie, a British politician, stood in front of reporters and
2. television cameras on a mild December morning and delivered a death sentence to the egg
3. industry. “Most of the egg production in this country, sadly, is now affected with salmonella,”
4. she announced in an official statement to the waiting journalists and TV crew. Elaboration
5. would have clarified that only the flocks had been “mostly” infected, not necessarily
6. their eggs—and the fact that, once properly cooked, all eggs were perfectly safe to eat.

*Extract from: https://www.myrecipes.com/extracrispy/how-one-politician-nearly-broke-the-british-egg-industry*

**Salmonella bacteria cause food poisoning.**

**Suggest ways that the incidences of food poisoning caused by Salmonella could be reduced**

1. **In the short term**
2. **In the long term**

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Roses that become infected by rose black spot usually have stunted growth.

Tomato plants also have stunted growth if they become infected with tobacco mosaic virus.

Explain why both of these communicable diseases cause stunted growth.

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**Lesson 4: Protist Diseases**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Objective: By the end of this lesson, you will be able to describe how communicable diseases caused by a protist affect the host and how their transmission might be reduced.**

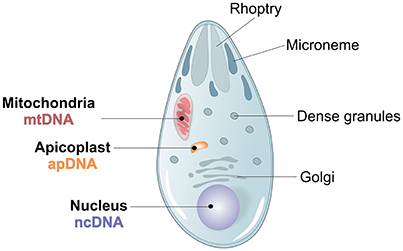
**Skills Drill / Retrieval**

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**Connect**

An image of a protist is shown on the left. Compare its structure to the structure of a prokaryotic cell.

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Icon

Description automatically generated with medium confidence

Icon

Description automatically generated with medium confidence

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Description automatically generated with medium confidence

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Description automatically generated with medium confidence

Icon

Description automatically generated with medium confidence

Logo

Description automatically generated

Explain why the following methods can be used to control the spread of malaria:

1. **I DO** - Insecticides

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1. **WE DO / YOU DO** - Mosquito nets

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1. **WE DO / YOU DO** - Insect repellents

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1. **WE DO / YOU DO** - Vaccination

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1. **WE DO / YOU DO** - Draining paddy fields that are used to grow rice

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1. **WE DO / YOU DO** - Releasing sterilised male mosquitos into habitats

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1. Bill Gates is one of the richest men in the world. He has invested $200,000,000 into
2. eradicating malaria via the Bill Gates Foundation. A key part of their strategy is to
3. use complex surveillance techniques and data management to identify when and
4. where outbreaks are likely. They then support communities in addressing the
5. malaria outbreak.

**List two methods that could be implemented quickly to respond to an outbreak.**

**Explain how they can help minimise cases of malaria.**

Method 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Method 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**List two methods that could be used to reduce the risk of future outbreaks.**

**Explain how each method reduces the risk of future outbreaks.**

Method 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Method 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explanation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Lesson 5: Detection and identification of plant diseases**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Objective: By the end of this lesson, you will be able to describe symptoms of disease in plants, how to identify the disease and the cause of some symptoms.**

**Skills Drill / Retrieval**

|  |  |  |
| --- | --- | --- |
| Answer | | PA / SA |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |

**Connect**

Tobacco mosaic virus infects over 150 species of plants. It causes the leaves to have a distinctive mosaic pattern; this happens because the virus infects chloroplasts, so they don’t contain much chlorophyll. This reduces the plant’s ability to do photosynthesis. This can reduce the plants growth because it makes less glucose by photosynthesis. This means that there is less glucose available for respiration and to make larger molecules required for growth like proteins and cellulose.

1. List two symptoms that plants might have if they are infected with tobacco mosaic virus.

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1. Explain why the plant gets one of these symptoms when it has a tobacco mosaic virus infection.

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**Task B**

The roots of the gorse plant have bacteria that turn nitrogen gas into nitrate ions.

Explain why nitrate ions are needed by the gorse plant.

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**I Do**

A scientist noticed that in one area gorse plants can have yellow leaves and stunted growth.

One reason for yellow leaves and stunted growth is a deficiency of nitrate ions in the soil.

Explain **two** other possible reasons for the yellow leaves and stunted growth.

Do **not** refer to nitrate ions in your answer.

Reason 1

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Explanation

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Reason 2

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Explanation

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**We Do / You Do**

Plants infected with aphids may show symptoms of magnesium deficiency.

Magnesium deficiency symptoms include:

•   yellow leaves

•   stunted growth.

Explain how a deficiency of magnesium could cause these symptoms.

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**Lesson 6: Plant defences**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Objective: By the end of this lesson, you will be able to describe how plants defend themselves using physical, chemical and mechanical defences.**

**Skills Drill / Retrieval**

|  |  |  |
| --- | --- | --- |
| Answer | | PA / SA |
| 1 |  |  |
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**Connect**

A plant has yellow leaves and stunted growth.

1. Explain how a magnesium deficiency could cause these symptoms.

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1. Explain why a nitrate deficiency could cause one of these symptoms.

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1. Explain why tobacco mosaic virus might cause these symptoms.

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1. List three ways of confirming the cause of the symptoms.

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Plants have adaptations to help defend themselves and to help them survive.

**Figure 1** shows a nettle plant.

**Figure 1**

A picture containing diagram

Description automatically generated

(a)     Explain how the nettle is adapted for defence and protection.

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**Task A**

Many plants have evolved defence mechanisms.

**Figure 1** shows part of a gorse plant and part of a deadly nightshade plant.

**Figure 1**

A picture containing plant, vegetable

Description automatically generated

(a)  The gorse plant has evolved to have sharp thorns.

What type of defence response are thorns?

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**(1)**

(b)  How do thorns defend the gorse plant?

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**(1)**

(c)  The deadly nightshade plant has poisonous berries.

What type of defence response are poisonous berries?

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**(1)**

**I Do**

Explain how plants defend themselves against microorganisms.

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**We Do / You Do**

Explain how plants defend themselves against organisms that might harm them.

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