

Answers: B4.6– Learning about Viral Diseases

Connection

1. Viruses, bacteria, protists, fungi.
2. Measles, salmonella, malaria, black spot. (these are the examples given in the book but allow any correct answer).
3. Any one of: good hygiene, isolation of infected individuals, destruction of vectors, vaccination.

Demonstration

- 1 Genetic material replicates inside host cells
- 2 Measles: fever and a red rash over the skin. HIV: initially causes a flu-like illness
TMV: leaves have discoloured 'mosaic' patterns
- 3 HIV is spread by sexual contact or exchange of body fluids such as blood. This can occur if drug users share needles. Control: use condoms, not sharing needles, taking antiretroviral drugs
- 4 TMV: virus gains access through a break in the skin or plant Epidermis. Controlled by removal of infected plant material, controlling pests, sterilising tools (using heat), washing hands after handling infected plants
- 5 HIV virus enters the lymph nodes and attacks the body's immune cells. AIDS, occurs when the body's immune system is no longer able to deal with other infections or cancers
- 6 Bacteria are living cells that survive outside body cells. They can be treated with prescribed drugs. Viruses are only found inside host cells, where they are protected from drugs
- 7 Measles spreads through droplet infection (talking, coughing, sneezing so tiny droplets of the virus are inhaled by others) whereas HIV is only spread by direct contact (sexual contact or exchange of body fluids such as blood). Measles is considered more infectious.

Lesson 7 B4.7 – Studying Bacterial Disease

Connection

- Q1. What is the basic structure of a virus?
Q2. Give 3 examples of viruses.
Q3. Using one of the examples above, state how it spreads and how we can prevent this.

Activation

LI: Describe the symptoms of some bacterial diseases and explain how they can be controlled.

1. <https://www.youtube.com/watch?v=Z5c8lVXDiqc>
2. Make a note of the title and the LI
3. Read pages 142-143
4. Define the Key words: Salmonella, diarrhoea



Consolidation

Complete and self assess the relevant past paper question for this topic -
From the B4 DIP file

Demonstration

Attempt questions 1-7 (5-7 higher tier only).
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9



Answers: B4.7– Studying Bacterial Disease

Connection

1. A strand of genetic material inside a protein coat.
2. Examples in book: Measles, HIV, Tobacco mosaic virus (TMV). Accept any other correct examples.
3. Measles – spread by droplets. Can be controlled by vaccination.
HIV – Spread by direct contact/exchange of fluid. Can be controlled using antiretroviral drugs.
TMV – Enters plants via wounds. Can be controlled by removal of infected material, controlling pests, sterilising tools, washing hands after handling infected plant.

Demonstration

- 1 Salmonella and Gonorrhoea
- 2 Salmonella: fever; abdominal cramps; vomiting; diarrhoea
Gonorrhoea: a thick yellow or green discharge from the vagina or penis; pain when urinating
- 3 •ingesting food contaminated with Salmonella bacteria •preparing food in unhygienic conditions.
- 4 •treatment with antibiotics e.g. penicillin, but in recent years many resistant strains have appeared •use of a barrier method of contraception, e.g. a condom, to prevent contact.
- 5 There are more cases in: •summer months – due to BBQs and food left out in warm rooms •November-December: Christmas parties/dinners with undercooked food, food left in warm rooms etc
- 6 If we know how diseases are spread, measures can be taken to prevent these situations e.g. if we know salmonella is passed by: •poor personal hygiene, people can be informed, facilities provided etc. •undercooked food – food can be prepared according to instructions and cooked for required time •poor storage of food – food can be stored in the correct conditions etc.
- 7 Bacterial diseases caused by living bacterial cells that release toxins and are easy to control by using antibiotics. Some bacteria are useful. Bacteria are larger than viruses. Viral diseases caused by virus particles living inside host cell and destroying them; they cannot be affected by drugs so you need to be vaccinated.

Lesson 8 B4.8 – Looking at Fungal Disease

Connection

- Q1. Give 2 examples of bacterial disease.
- Q2. List 3 symptoms of salmonella related food poisoning.
- Q3. Why is it important to cook food properly?



Activation

LI: Understand the transmission and treatment of fungal disease.

1. <https://www.youtube.com/watch?v=2Fh-2wpvhHQ>
2. Make a note of the title and the LI
3. Read pages 144-145
4. Define the key words: Pruning, spores.

Consolidation

Complete and self assess the relevant past paper question for this topic -
From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt questions 1-5.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9



Answers: B4.8– Looking at Fungal disease

Connection

1. Salmonella, gonorrhoea are examples given in book. Accept any other correct answer.
2. Fever, abdominal cramps, vomiting, diarrhoea.
3. Cooking food thoroughly will kill the bacteria that could cause food poisoning.

Demonstration

- 1 Causes black or purple spots on upper surface of leaves; leaves can be yellow around the spots; leaves can drop early; can form black scab-like spots on stems
- 2 Warm, wet conditions
- 3 Produces spores released in wet conditions and spread by wind. Spores overwinter on shoots and survive in soil. Spread by infected leaves, which should not be composted
- 4 Removing infected leaves – removes spores
Pruning and burning infected stems – removes spores
Using fungicides – kills fungus
Putting manure/mulch around plants stops spores reaching stems
Not composting infected leaves – stops spores spreading
- 5 Blackspot fungus grows in the mesophyll. This causes irreversible structural changes in affected cells and cells cannot photosynthesise to make food needed for growth.

Lesson 9 B4.9- Learning about Malaria

Connection

- Q1. Give an example of a fungal disease.
- Q2. Name 3 possible treatments for a plant effected by a fungal disease.
- Q3. How is rose growth affected by black spot?



Activation

LI: Recall that malaria is a protist disease and describe the life cycle of the malaria vector.

1. <https://www.youtube.com/watch?v=aGWP3Xbk0OY>
2. Make a note of the title and the LI
3. Read pages 146-147
4. Define the key words: protist, vector
5. Draw figure 4.30

Consolidation

Complete and self assess the relevant past paper question for this topic -
From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt questions 1-5.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9



Answers: B4.9– Learning about Malaria

Connection

1. Rose black spot is the book example. Accept any other correct answer.
2. Removing infected areas, pruning, not composting infected leaves, treating infections with fungicides, putting manure or mulch around plants to prevent fungal spores reaching stems.
3. It stops the affected leaves from photosynthesising properly.

Demonstration

- 1 A protist called Plasmodium
- 2 recurrent episodes of fever; sweats and chills; muscle pains; headaches; diarrhoea; cough.
- 3 An organism that spreads disease without causing it
- 4 Malaria is spread by female mosquitoes, which feed on blood. They suck infected blood from someone with malaria and then pass the protists on when they feed on a new person.
- 5 Mosquitoes breed and lay eggs in still water. The eggs hatch and each larva develops into a pupa in the water. When an adult mosquito hatches, it rests on the water surface to let its body dry and harden so it can fly.

Lesson 10 B4.10 – Protecting the Body

Connection

Q1. What is a protist?

Q2. What role does a mosquito hold in the spread of malaria?

Q3. list 3 symptoms of malaria.



Activation

LI: Describe and explain how the body protects itself from pathogens.

<https://www.youtube.com/watch?v=aq-F4rNuj3Y>

1. Make a note of the title and LI.
2. Read pages 148 and 149.
3. Define the key words – cilia, goblet cell.
4. Copy and label fig 4.31.

Consolidation

Complete and self assess the relevant past paper question for this topic -
From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt questions 1-7.

In 15 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Green questions to GCSE Level 3

Blue questions to GCSE Level 6

Purple questions to GCSE Level 9



Answers: B4.10– Protecting the Body

Connection

1. A protist is a single celled organism. It can cause disease, e.g. malaria.
2. The vector.
3. Fever, sweats, chills, muscle pain, headaches, diarrhoea, cough.

Demonstration

- 1 Skin is a barrier and produces antimicrobial secretions. The nose traps particles and pathogens. Your trachea and bronchi secrete mucus to trap pathogens. The stomach produces acid, which kills pathogens Platelets help to form clots which dry to form scabs to seal wounds
- 2 Stomach acid (and possibly skin)
- 3 When you cough or sneeze, thousands of tiny drops of liquid containing pathogens are sprayed into the air.
- 4 Platelets in blood are exposed to the air at the wound site. They make protein fibres that form a mesh and platelets and red blood cells get caught in the fibres to form a clot. Scabs protect the body by forming a barrier and preventing pathogens entering the body through the site of the injury whilst the skin is healing.
- 5 Pathogens cannot easily penetrate the outer layer of dead cells. Sebaceous glands produce antimicrobial oils.
- 6 Hairs in the nose trap larger microbes and dust particles. The trachea and bronchi have a ciliated epithelium. Goblet cells in the epithelium produce mucus; mucus traps smaller dust particles and microbes. Cilia beat together to waft mucus to the back of the throat, where it is swallowed.
- 7 Damage and paralysis of the cilia result in mucus that trap dust and microbes not being moved to the back of the throat so they are more likely to cause infection in the respiratory tract.

Lesson 11 B4.11 – Exploring White Blood Cells

Connection

Q1. What is your skin's role in helping to protect the body?

Q2. How does your stomach help to prevent pathogens entering the body?

Q3. What is the role of mucus in protecting the body from pathogens?



Activation

LI: Describe phagocytosis and how antibody production can lead to immunity.

<https://www.youtube.com/watch?v=qWSWWPZYGHU>

1. Make a note of the title and the LI
2. Read pages 150-151.
3. Define the key words – Antibody, immunity, lymphocyte and phagocyte.
4. Draw and label fig. 4.35.

Consolidation

Complete and self-assess the relevant past paper question for this topic -
From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt questions 1-7.

In 15 mins answer as many questions as you can.

Self-mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Green questions to GCSE Level 3

Blue questions to GCSE Level 6

Purple questions to GCSE Level 9



Answers: B4.11– Exploring White Blood Cells

Connection

1. Acts as a physical barrier and has glands that release antimicrobial secretions.
2. Produces acid that kills the majority of pathogens that enter through the mouth.
3. Traps pathogens it comes into contact with.

Demonstration

- 1 They ingest pathogens, make antitoxins and antibodies
- 2 It is ingested, killed and digested by enzymes
- 3 Antitoxins combine with toxins to make safe chemicals. Antitoxins are specific to a particular toxin.
- 4 Lymphocytes quickly reproduce when they detect a pathogen to make lots of antibodies. If the same type of pathogen enters the body again, lymphocyte cells recognise it and immediately make lots of antibodies. The person is then immune to that disease.
- 5 Phagocytosis destroys pathogens to stop them producing toxins and antitoxins neutralise any toxins that are produced to stop illness happening.
- 6 Each lymphocyte has a specific antibody to attack a specific pathogen. Pathogens carry chemicals called antigens on their surface. The appropriate antibodies lock onto the matching antigens, sticking the pathogens together to destroy them.
- 7 HIV damages white blood cells, meaning that they cannot make antibodies or kill other infected cells. When HIV has destroyed sufficient white blood cells, the body cannot make appropriate immune responses because they have fewer or no lymphocytes to recognise simple infections and release antibodies.

Lesson 12 B4.12 – Using Antibiotics and Painkillers

Connection

Q1. What are the 3 primary functions of WBC's?

Q2. What are the 2 main types of WBC's?

Q3. What is the role of antibodies?



Activation

LI: Describe and explain the uses of antibiotics and painkillers.

https://www.youtube.com/watch?v=r_5GM3_u0Wo

1. Make a note of the title and the LI
2. Read pages 152-153
3. Define the key words – Antiviral, opiates, aspirin and penicillin.
4. Copy and label fig. 4.41

Consolidation

Complete and self assess the relevant past paper question for this topic -
From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt questions 1-6.

In 15 mins answer as many questions as you can.

Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:

Green questions to GCSE Level 3

Blue questions to GCSE Level 6

Purple questions to GCSE Level 9



Answers: B4.12– Using Antibiotics and Painkillers.

Connection

1. Ingesting pathogens (phagocytosis), producing antibodies, producing antitoxins.
2. Phagocytes and lymphocytes.
3. They destroy pathogens.

Demonstration

- 1 Medicines contain useful drugs that alter how the body works
- 2 Similar: alleviate symptoms of disease Different: painkillers do not affect the pathogen but antibiotics kill the pathogens
- 3 When you are injured, sensory nerve endings send pain messages to your brain. Painkillers stop these nerve impulses, so you feel little or no pain
- 4 Painkillers alleviate symptoms but do not cure the disease whilst antibiotics kill the pathogens and cure the disease
- 5 Antibiotics cure bacterial infections but do not affect viral infections
- 6 **a** insufficient antibiotic so more bacteria are being produced than being killed
b a prescribed course of antibiotics has the correct amount to kill the bacterial pathogen completely. If the course is not finished, remaining bacteria will reproduce and the infection will return

Lesson 13 B4.13 – Building Immunity

Connection

- Q1. What is the definition of a drug?
- Q2. Give an example of a common antibiotic.
- Q3. Why is it important to complete an antibiotic prescription.



Activation

LI: Recall how vaccinations prevent infection and explain/evaluate vaccination programmes around the globe.

<https://www.youtube.com/watch?v=23fQscOSqVU>

1. Make a note of the title and LI.
2. Read through pages 154 and 155.
3. Define the key words: Immunity, vaccination, vaccine.
4. Copy and annotate fig. 4.44 – The immune response.

Consolidation

Complete and self assess the relevant past paper question for this topic -
From the B4 DIP file

Extension

Make a note of one thing you think you understand well and one thing that you would like to ask your teacher



Demonstration

Attempt questions 1-6.
In 15 mins answer as many questions as you can.
Self mark the questions you have done making any necessary corrections in blue pen

Challenge yourself to answer as many as you can:
Green questions to GCSE Level 3
Blue questions to GCSE Level 6
Purple questions to GCSE Level 9



Answers: B4.13– Building Immunity.

Connection

1. Any chemical that alters how the body works.
2. E.g. Penicillin
3. Not completing prescriptions can contribute to the development of antibiotic resistant bacteria.

Demonstration

- 1 A vaccination introduces a small quantity of an inactive or dead form of a pathogen into the body.
- 2 They protect us from viral diseases
- 3 **a** Lymphocytes recognise the pathogen and the shape of the antigen so quickly make many specific antibodies.
b If a person has had the infection s/he will have made their own antibodies and are unlikely to become ill again (or if they do, the infection will not be as severe and they will recover more quickly)
- 4 They increase the number of people who are immune to a pathogen, making it difficult for the pathogen to pass to people who are not immunised. If a large proportion of the population is immune to a pathogen, its spread is very much reduced.
- 5 The flu virus mutates into new strains very quickly and the old vaccines will not have the correct shape for the new antigens
6 Many countries have eradicated certain diseases that are still found in different continents/countries. Global vaccination programmes can eradicate these diseases world wide or eradicate new diseases in specific areas (e.g. Ebola) and prevent them from rapidly spreading again