

While you were away

Lesson 1 Review lesson

1. Name the four main types of pathogen
2. Describe symptoms of measles
3. Name one viral disease that affects plants
4. Describe symptoms of salmonella
5. Describe treatment and prevention of gonorrhoea
6. Describe the treatment and symptoms of rose black spot disease
7. Describe the cause and prevention of malaria

Lesson 2 Key content

1. How are pathogen spread?
2. How can we prevent the spread of pathogens?

Lesson 3 Human defences

1. How does the skin prevent the entry of pathogens?
2. How does ciliated cells and mucus prevent the entry of pathogens?

Lesson 4 Vaccination

1. What is a vaccine?
2. How do vaccines work?

Lesson 5 Antibiotics and painkillers

1. What are antibiotics used to treat?
2. What is a painkiller?

Lesson 6 Developing drugs

1. State the three main stages of drug development.
2. What is a placebo?
3. What drugs are obtained from plants?

Lesson 7 Producing Monoclonal antibodies

1. How are monoclonal antibodies produced?

Lesson 8 Uses of monoclonal antibodies

1. How are monoclonal antibodies used?

Lesson 9 Detection and identification of plant diseases

1. State the symptoms of nitrate and magnesium deficiencies
2. Describe symptoms of plants diseases

SUBJECT: Science

UNIT: Infection and Response



Pathogens – micro-organisms that cause disease

There are four main pathogens. Bacteria – small cells that reproduce quickly and produce toxins. Viruses – smaller than bacteria, reproduce quickly, and live inside cells. Protists – carried by vectors and live inside other organisms. Fungi – spread to other organisms through spores.

Ambitious Vocabulary

Pathogen Antibiotics
Vaccination Drugs

Plant diseases

Plants need ions from the soil: nitrates – stunted growth
Magnesium – yellow leaves.

Plant diseases – common signs include stunted growth, spots on leaves, patches of decay, abnormal growth, malformed stems or leaves. Waxy cuticles, cell walls, thorns and hairs or leaves that droop and curl can protect plants from pathogens

How pathogens are spread

Pathogens can be spread by:

Water – drinking dirty water
Air – breathed in
Direct contact – touching contaminated surfaces including the skin

Preventing the spread of disease

Ways to reduce the spread of diseases include; being hygienic, destroying vectors, isolation, and vaccination.

Viral Diseases

Measles is spread by droplets of liquid from sneezes and coughs. Symptoms include a red rash on the skin and a fever. Measles can be fatal.

HIV is spread by sexual contact or exchanging body fluids. HIV can be controlled by antiviral drugs which stops the virus replicating. The virus attacks cells in the immune system. If the immune system is badly damaged the body cannot cope with other infections. This is the late stage and is called AIDS.

Tobacco mosaic virus affects plants. Parts of the leaves become discoloured which means that plant cannot carry out photosynthesis and therefore cannot grow.

Phagocytosis

When a pathogen enters the body it is detected by **lymphocytes** which release antibodies and antitoxins. The **antibodies** bind to the antigens on the pathogen and **immobilise** it. Each antibody is specific to a pathogen. The antitoxins **neutralise** the toxins released by the pathogens. When the antibodies **immobilise** the pathogen white blood cells known as **phagocytes** **engulf** and **destroy** the pathogen.

Drugs

Painkillers relieve the pain and symptoms but do not tackle the cause.

Antibiotics kill the bacteria causing the problem but do not work on viruses. Viruses are difficult to kill because they live inside the body cells.

Vaccination

A dead or weakened version of the pathogen is put into the body. This carries antigens which cause your body to produce antibodies which will attack the pathogen. If you are infected again, the white blood cells can produce antibodies quickly.

Bacterial Diseases

Salmonella bacteria causes food poisoning. Symptoms include fever, stomach cramps, vomiting, and diarrhoea. Wash hands and avoid contaminated food.

Gonorrhoea is a sexually transmitted disease passed on by sexual contact. Symptoms include pain when urinating and thick yellow/green discharge from the vagina or penis. To prevent the spread people should be treated with antibiotics and use a condom

Fighting disease

Skin acts as a barrier. Hairs and mucus trap particles. Cilia in throat transport mucus out. Stomach contains acid

Fungal and Protist Diseases

Rose black spot is a fungal disease which causes black spots on leaves so less photosynthesis can occur. Treated using fungicides.

Malaria is caused by a protist carried by mosquitoes (vectors). Killing mosquitoes stops the spread of malaria

Monoclonal antibodies

Antibodies produced from hybridoma cells (lymphocyte + tumour cell) used to treat and diagnose disease

Drugs from plants

Chemicals produced by plants can be used to treat diseases or help with symptoms. Aspirin is from willow trees. Digitalis is from foxglove flowers. Penicillin is found in a mould.

Developing Drugs

Three main stages in drug development are

1. Drugs are tests on human cells and tissues
2. Testing carried out on live animals
3. Tested on healthy human volunteers in clinical trials. Starts with a very low dose, then tested on people with the illness to find the optimum dose.

Placebo is a substance like a drug but does not do anything. Double blind trial is when both the doctor and the patient do not know whether they are getting the drug