Beckfoot

Subject: Trilogy Science (Biology)	Topic: **Infection and Response**	Year Group: 10

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Knowledge: Human Defence System

Skin	Acts as a barrier and produces antimicrobial secretions
Nose	Traps particles that contain pathogens
Trachea	Secretes mucus which traps pathogens
Stomach	Produces acid which kills pathogens
White blood cells	Help defend against pathogens by: phagocytosis, making antibodies and antitoxins

Knowledge : Antibiotics and painkillers

Antibiotics	Treat disease
	Specific antibiotics treat specific diseases
	Reduced deaths from infectious bacterial diseases
	Cannot treat viral pathogens
Penicillin	An antibiotic that helps cure bacterial diseases by killing ineffective bacteria inside the body
Painkillers	Treat symptoms of disease but do not kill pathogens
Problems	Greater use of antibiotics has led to the emergence of strains of bacteria that are resistant to antibiotics (superbugs)

Knowledge: Viral diseases

Measles	Fever and red skin rash – can be fatal. Spread by coughs and sneezes
HIV	Human Immunodeficiency Virus
	Flu-like illness. Virus attacks immune system. Spread by sexual contact or exchange of bodily fluids
TMV	Tobacco Mosaic Virus
	Plant pathogen causes discolouration (mosaic) in leaves and affects growth.

Knowledge: Bacterial Diseases

Salmonella food poisoning	Spread by bacteria on food. Causes fever, abdominal cramps, vomiting and diarrhoea.
Gonorrhoea	Sexually transmitted disease (STD). Causes thick yellow/green discharge from genitals.

Knowledge: Fungal diseases

Example	Rose black spot
Symptoms	Purple or black spots on leaves
Effect	Leaves turn yellow and drop off – no photosynthesis or growth
How it spreads	Water or wind
Prevention	Fungicides and remove affected leaves

Knowledge :Protist diseases

Example	Malaria
Symptoms	Fever and death
How it spreads	Mosquito spreads malaria protist by biting humans
Prevention	Mosquito nets and mosquito repellents

Key Vocabulary

1	Communicable Disease	A disease that can be passed on to others
2	Non Communicable Disease	A disease that cannot be passed on to others.
3	Pathogen	Microorganisms that cause infectious diseases.
4	Bacteria	Reproduce rapidly in body and may produce poisons (toxins).
5	Virus	Live and reproduce in cells, causing cell damage.

Knowledge: Vaccination

1	Small quantity of dead or inactive pathogen is injected into the body
2	White blood cells produce antibodies
3	If the same pathogen re-enters the body white blood cells can produce antibodies quickly
4	Antibodies prevent infection
5	If a large proportion of the population is immune, the spread of the pathogen is reduced greatly.

Knowledge : History of drugs

Older drugs were extracted from plants and microorganisms

Drug	Extracted from
Digitalis (heart drug)	Foxgloves
Aspirin	Willow
Penicillin	Penicillium mould

Clinical trials use healthy volunteers and patients.

- Very low doses of the drug are given at the start of the clinical trial.
- If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug.
- In double blind trials, some patients are given a placebo.

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Knowledge: Monoclonal Antibodies

Identical copies of one types of antibody produced in laboratory

1	A mouse is injected with pathogen.
2	Lymphocytes produce antibodies.
3	Lymphocytes are removed from the mouse and fused with rapidly dividing mouse tumour cells .
4	The new cells are called hybridomas
5	The hybridomas divide rapidly and release lots of antibodies which are then collected.

Knowledge : Detection and prevention of plant diseases

Detection	Identification
1-Stunted growth	Reference using gardening manual or website, laboratory test for pathogens, testing kit using monoclonal antibodies
2- Spots on leaves	
3- Area of decay	
4 -Growths	
5- Malformed stems/leaves	
6 - Discolouration	
7 - Presence of pests	

Plant Defences

Physical	Mechanical
Thick waxy layers, cell walls stop pathogen entry	Thorns, curling up leaves to prevent being eaten
Chemical	
Antibacterial and toxins made by the plant.	

Knowledge: Monoclonal Antibodies can be used in a variety of ways

Diagnosis	Detecting Pathogens	Detecting molecules	Treatment
Pregnancy test – measure the level of hormones	Can detect very small quantities of chemicals in the blood	Fluorescent dye can be attached so it can be seen inside cells or tissues	Bound to radioactive substance, toxic drug or chemical Cancer cells are targeted to normal body cells are unharmed