

Core questions – Biology unit 3 - Infection and Response

No.	Question	Answer
1	What is a pathogen?	A microorganism that causes infectious disease.
2	Name four ways in which diseases caused by pathogens can be spread.	Through air, through water, direct contact (e.g. STDs), vectors.
3	Name four ways in which the spread of diseases can be reduced or prevented.	Hand-washing, safer sex practices, vaccination, eradication of vectors.
4	Name the four classes of pathogens.	Viruses, bacteria, protists, fungi.
5	Why does there is a short delay between infection by a pathogen and feeling ill from the infection?	Bacteria and viruses may reproduce rapidly inside the body.
6	How do bacteria make us ill?	May produce poisons (toxins) that damage tissues
8	How do viruses make us ill?	Live and reproduce inside cells, causing cell damage
9	What type of pathogen is the measles?	A virus
10	What are the symptoms of the measles virus?	Fever and a red skin rash.
11	How is the measles virus spread?	Inhalation of droplets from sneezes and coughs.
12	Why are children vaccinated against the measles virus?	Measles is a serious illness that can be fatal if complications arise.
13	What type of pathogen is HIV?	A virus
14	What are the initial symptoms of HIV infection?	HIV initially causes a flu-like illness.
15	What is the aim of antiretroviral drugs?	To stop the virus from replicating.
16	How does HIV lead to AIDS?	When the body's immune system becomes so badly damaged it can no longer deal with other infections or cancers.
17	How is HIV spread?	Sexual contact or exchange of body fluids such as blood which occurs when drug users share needles.
18	What type of virus is TMV?	A virus
19	What is TMV and what type of organism does it affect?	A widespread plant pathogen affecting many species of plants including tomatoes.
20	What are the symptoms of TMV?	A distinctive 'mosaic' pattern of discolouration on the leaves
21	How does TMV affect the plant?	Reduces the growth of the plant due to lack of photosynthesis
22	What type of pathogen is salmonella?	Bacteria
23	How is salmonella food poisoning spread?	By the bacteria being ingested in food, or on food prepared in unhygienic conditions.
24	What are the symptoms of salmonella?	Fever, abdominal cramps, vomiting and diarrhoea
25	How are the symptoms of salmonella caused?	By the toxins that the bacteria release
26	How is the spread of Salmonella controlled in the UK?	In the UK, poultry are vaccinated against Salmonella.
27	What type of pathogen is Gonorrhoea?	Bacteria
28	How is the bacterial disease Gonorrhoea spread?	Gonorrhoea is spread by sexual contact.
29	How can the spread of the bacterial disease Gonorrhoea be controlled?	Treatment with antibiotics or use of a barrier method of contraception e.g. condoms.

30	What are the symptoms of Gonorrhoea?	Thick yellow or green discharge from the vagina or penis and pain on urination.
31	What issues are there with the treatment for Gonorrhoea?	Lots of antibiotic resistant strains have now appeared.
32	What type of pathogen is rose black spot?	Fungal
33	What are the symptoms of rose black spot disease?	Purple or black spots develop on leaves, which often turn yellow and drop early.
34	How is rose black spot spread?	It is spread in the environment by water or wind.
35	How does rose black spot affect a plant?	It affects the growth of the plant as photosynthesis is affected due to discolouration & destruction of the leaves.
36	How can rose black spot be treated?	Using fungicides and/or removing and destroying the affected leaves.
37	What causes malaria?	A protist
38	What is a protist?	Often a parasite that lives on or inside other organisms
39	What is a vector?	An organism that carries and transfers a protist to other organisms without becoming ill itself
40	How is malaria spread?	Spread via mosquitos (the vector) transferring the malarial parasite (protist) into other organisms
41	What are the symptoms of malaria?	Recurrent episodes of fever and can be fatal
42	How is malaria treated?	Anti-malarial drugs.
43	How is the spread of malaria controlled?	Eradication of vectors such as mosquitos and/or use of mosquito nets at night to avoid being bitten.
44	What are the four first line non-specific defence systems of the human body against pathogens?	Skin, nose, trachea and bronchi, stomach.
45	How does the nose, trachea and bronchi act as a first line of defence?	Cells secrete mucus that traps pathogens, and cilia cells have hair like structures that remove trapped pathogens
46	What is present in the stomach to kill pathogens?	Hydrochloric acid
47	What is the role of the immune system?	If a pathogen enters the body the immune system tries to destroy the pathogen.
48	Name three ways in which white blood cells help to defend against pathogens.	Phagocytosis (engulfs the pathogens), antibody production, antitoxin production
49	What is an antibody?	A specific protein that attaches to the pathogen, destroying it
50	What is an antigen?	A specific molecule on the surface of each pathogen, that antibodies can attach to
51	What is the purpose of vaccination programmes?	Can prevent illness in an individual and reduces spread of the pathogen in a population.
52	What does a vaccination contain?	A small quantity of dead or inactive forms of a pathogen.
54	How does the contents of a vaccine prevent future infection?	It stimulates the white blood cells to produce antibodies.
55	What happens if a person who has been vaccinated against a particular pathogen is infected with that pathogen?	The white blood cells respond quickly to produce the correct antibodies quickly , preventing illness
56	What is an antibiotic?	A drug that kills only bacteria
57	How do antibiotics work?	Prevent the cell wall from forming or prevent the DNA from being replicated
58	What are the current concerns around antibiotic treatment?	The emergence of bacterial strains resistant to antibiotics means many antibiotics no longer work

59	What are painkillers?	Drugs that treat the symptoms of disease, but don't kill the pathogens
60	What are the issues with treating viral diseases?	Antibiotics cannot kill viral pathogens. It is difficult to develop drugs that kill viruses without also damaging the body's tissues.
61	Name three examples of drugs extracted from plants and microorganisms and state what they are used for.	<ol style="list-style-type: none"> 1. The heart drug digitalis originates from foxglove plants 2. The painkiller aspirin originates from willow trees 3. Penicillin was discovered by Alexander Fleming from the <i>Penicillium</i> mould
62	What is the starting point of some new medicines?	Chemicals extracted from a plant
63	How are most drugs manufactured now?	Synthesised by chemists in the pharmaceutical industry.
64	What does efficacy mean?	Whether the drug works to treat the illness
65	Why do new drugs need to be tested and trialled?	For toxicity, efficacy and dose to check that they are safe and effective.
66	What is preclinical testing?	Preclinical testing is done in a laboratory using cells, tissues and live animals.
67	What is involved in the first phase of a clinical trial?	A small number of healthy volunteers are given very low doses of the drug
68	What is the purpose of the first phase of a clinical trial?	To check for side effects, toxicity & safety
69	What happens in the second phase of a clinical trial?	Drug is tested on patients
70	What is the purpose of the second phase of a clinical trial?	To test for side effects, and effectiveness
71	What happens in the third phase of a clinical trial?	Larger numbers of patients used
72	What is the purpose of the third phase of a clinical trial?	To determine the correct dose, and test for effectiveness
73	What is a placebo?	A fake drug that looks and tastes the same as the real drug
74	What is a double blind trial?	Patients are split into two groups with some given the real drug, and some the placebo. Neither the doctor nor patient know whether they have been given a placebo, only the scientist running the trial
75	Why do scientists run double blind trials?	To avoid bias from the patient or the doctor
76	What happens after all the phases of a drug trial have been completed?	Scientists analyse the results and give conclusions as to whether the drug is safe to be given a license
77	What is a peer review?	When other scientists look at the results of the trial to see if they agree with the conclusions
78	Why is it important drug trial results are peer reviewed?	To avoid bias, and prevent false claims
79T	How are antibodies made? (Triple only)	By B-lymphocyte (B-cell) cells, which is a type of white blood cell
80T	How does a monoclonal antibody work? (Triple only)	It binds to the antigen of a specific chemical or cell
81T	How are monoclonal antibodies made? (Triple only)	<ul style="list-style-type: none"> • Stimulate mouse lymphocytes to make a particular antibody by injecting it with a particular antigen • Combine the antibody producing lymphocytes with a tumour cell to make a hybridoma cell • The hybridoma cell divides and makes the antibody • The hybridoma is cloned to produce many cells • The antibody is then collected and purified
82T	Why are antibodies specific to one type of antigen? (Triple only)	They have a special shaped binding site that only fits with specific antigens

83T	What is a hybridoma cell? (Triple only)	The combination of a lymphocyte and a tumour cell
84T	Why are hybridoma cells created? (Triple only)	They have the ability to create the required antibody and divide quicker than the lymphocyte on its own
85T	Name 4 possible uses of monoclonal antibodies. (Triple only)	<ol style="list-style-type: none"> 1. For pregnancy tests/diagnosis 2. Measurement of hormone/chemical/pathogen levels in the blood 3. Research to identify specific molecules in cells or tissues by binding with fluorescent dyes 4. Treatment of some diseases like cancer
86T	How can antibodies be used to treat conditions such as cancer? (Triple only)	Bind to a radioactive/toxic substance that are able to stop cells growing and dividing.
87T	What is the advantage of using monoclonal antibodies over traditional treatments such as chemotherapy and radiotherapy? (Triple only)	They only bind to very specific cells (cancer cells), meaning other body cells aren't damaged
88T	What are the disadvantages of using monoclonal antibodies? (Triple only)	Cause more side effects than were originally expected
89T	Name three ways of visually detecting a plant disease. (Triple only)	Stunted growth; spots on leaves; areas of decay (rot); growths on part of the plant; malformed stems or leaves; discolouration; the presence of pests.
90T	Name three ways to identify a plant disease. (Triple only)	<ol style="list-style-type: none"> 1. Look symptoms up in a gardening manual or website 2. Taking the infected plant to a laboratory to identify the pathogen 3. Using a testing kits that contains monoclonal antibodies
91T	Name four possible causes of plant diseases. (Triple only)	Viruses; bacteria; fungi; insects (e.g. aphids)
92T	How do aphids damage plants? (Triple only)	Pierce stems with their mouthparts to drink sugary liquid in phloem, introduce pathogens and deprive plants of sugars.
93T	What are two problems caused in plants by an ion deficiency? (Triple only)	Stunted growth caused by nitrate deficiency AND chlorosis caused by magnesium deficiency.
94T	Why does a lack of nitrate ions affect plant growth? (Triple only)	Nitrate ions are used to make proteins and therefore growth
95T	Why does a lack of magnesium ions affect plant growth? (Triple only)	Magnesium ions are used to make chlorophyll.
96T	Name three physical defences of plants. (Triple only)	Cellulose cell walls, tough waxy cuticle on leaves, layers of dead cells around stems (bark on trees) which fall off.
97T	Name two chemical defences of plants. (Triple only)	Antibacterial chemicals, poisons to deter herbivores
98T	Name three mechanical defences of plants. (Triple only)	Thorns and hairs deter animals, leaves which droop or curl when touched, mimicry to trick animals