

B1.3 Disease fact sheet (triple biology)

Health	
1. Define 'health'	A state of physical and mental well-being
2. Define 'communicable' disease	A disease that can be transmitted from one organism to another
3. Define 'non-communicable' disease	A disease that is not transmitted from one organism to another
4. Name 3 factors, other than disease, that can have a profound effect on physical and mental health	Diet, stress and life situations
5. What impact do immune system defects have on an individual?	More likely to suffer from communicable (infectious) diseases
6. Name the disease that can be triggered by viruses living inside cells	Cancer
7. Name the diseases that can be triggered by an immune reaction to a pathogen	Allergies (such as skin rashes and asthma)
8. Name the diseases that severe physical ill health can lead to	Depression and other mental illness
9. Define 'pathogen'	Microorganisms that cause infectious disease
10. Name the 4 types of pathogens	Viruses, bacteria, protists, and fungi
Communicable disease - viruses	
11. Describe how viruses make us feel ill	They live and reproduce inside cells which damages them
12. Name 2 human diseases that are caused by viruses	Measles and HIV infection
13. Name the symptoms of measles	Fever and red skin rash
14. Describe why most young children are vaccinated against measles	It is a serious illness that... can be fatal if complications arise
15. Describe how the measles virus is spread	By inhalation of droplets from coughs and sneezes
16. State how to prevent/ reduce the spread of measles	Vaccination
17. Name the initial symptom of HIV infection	Flu – like illness
18. How can the HIV virus be prevented from attacking the body's immune cells?	Use of antiretroviral drugs
19. Describe what happens during late stage HIV infection/ AIDS	Badly damaged immune system Can't deal with other infections or cancers
20. Describe how the HIV virus is spread	Exchange body fluids during sexual contact Drug users share needles (exchange blood)
21. Describe how to prevent/ reduce the spread of HIV	Use condoms, programmes for drug users to get sterile needles

22. Name a virus that causes disease in many plants, including tomatoes	Tobacco mosaic virus (TMV)
23. Explain the effect of TMV on plants	Growth affected due to lack of photosynthesis caused by a mosaic pattern of discolouration on leaves
24. Describe how TMV is spread	Direct contact with infected plant Spread by insects or on tools/ hands
Communicable disease - bacteria	
25. Describe how bacteria make us feel ill	They produce poisons (toxins) that damage tissues
26. Name 2 human diseases that are caused by bacteria	<i>Salmonella</i> food poisoning and Gonorrhoea
27. Name the symptoms of <i>Salmonella</i> food poisoning	Fever, abdominal cramps vomiting and diarrhoea
28. Describe how <i>Salmonella</i> is spread	By ingesting the bacteria in food, or on food prepared in unhygienic conditions
29. Describe how the spread of <i>Salmonella</i> is controlled in the UK	Poultry are vaccinated
30. Describe the symptoms of Gonorrhoea	A thick yellow or green discharge from the vagina or penis and pain on urinating
31. State how Gonorrhoea is spread	Sexual contact
32. Describe how the spread of Gonorrhoea is controlled	Treatment with antibiotics or barrier methods of contraception eg condoms
33. Describe why Gonorrhoea is not easy to treat with the antibiotic penicillin	Many penicillin resistant strains appeared
Communicable disease - protists	
34. Name a human disease that is caused by a protist	Malaria
35. Describe the symptoms of malaria	Recurrent episodes of fever Can be fatal
36. Describe how malaria is spread	Through the bite of an infected mosquito (a vector)
37. Describe how the spread of malaria is controlled	Prevent mosquitos from breeding and use mosquito nets to avoid bites
Communicable diseases - fungal	
38. Name a plant disease that is caused by a fungus	Rose black spot
39. Explain the effects of Rose black spot disease on plants	Growth is affected due to a lack of photosynthesis because... purple or black spots develop on leaves which often turn yellow and drop early
40. Describe how Rose black spot disease is spread	In the environment by water or wind
41. Describe how to treat Rose black spot disease	Use fungicides Remove and destroy the affected leaves

Human defences	
42. Describe how the body's non-specific defence system prevent pathogens from entering the body	<ol style="list-style-type: none"> 1. Skin – Barrier to pathogens. Scabs and blood clots (seal wounds to restore barrier) 2. Nose – Has hairs and mucus (traps pathogens and large particles) 3. Trachea and bronchi – Mucus (traps pathogens) & cilia (tiny hairs- move mucus to back of throat) 4. Stomach – Contains HCl (kills pathogens)
43. What happens if a pathogen enters the body?	The immune system tries to destroy it
44. Name the type of cell that destroys pathogens that enter the body	White blood cells
45. List 3 ways white blood cells destroy pathogens	<ol style="list-style-type: none"> 1. Phagocytosis (engulf and digest) 2. Make antibodies 3. Make antitoxins which stop the toxins
Vaccination, antibiotics and painkillers	
46. Define 'antigen'	A chemical on the surface of a pathogen that antibodies recognise as foreign
47. What do vaccines contain?	Dead or inactive pathogens
48. State the body's response to a vaccine	White blood cells stimulated to produce the correct antibody
49. Explain how illness/ infection is prevented in the vaccinated person	(Memory) white blood cells recognise the pathogen's antigen and respond quickly to produce lots of the correct antibody
50. State the benefit of immunising (vaccinating) a large proportion of the population (herd immunity)	Reduces the spread of pathogens
51. Define 'antibiotic'	Medicine that helps cure bacterial disease by killing bacteria inside the body
52. Name an antibiotic	Penicillin
53. Describe the impact of antibiotic use on the number of deaths from infectious diseases	Has greatly reduced the number of deaths
54. What is causing great concern about antibiotics now?	The emergence of resistant strains of bacteria
55. Name the pathogen that antibiotics can't kill	Viruses
56. State why it is difficult to develop drugs that kill viruses	They could also damage the body's tissues (because viruses live and reproduce inside our cells)
57. State what painkillers are used for	To treat the symptoms of disease (but not to kill the pathogens)
Monoclonal antibodies (Higher tier triple biology only)	
58. Define 'monoclonal antibody'	Antibodies that are produced from a single clone of cells
59. Explain why monoclonal antibodies are useful	Can target a specific chemical/ cells in the body Because they are specific to 1 binding site On 1 protein antigen

60. Define 'hybridoma cell'	Lymphocytes combined with a particular type of tumour cell
61. Describe how monoclonal antibodies are produced	<ol style="list-style-type: none"> 1. Mouse lymphocytes stimulated to make a specific antibody 2. Lymphocytes combined with tumour cell to produce a hybridoma cell 3. Hybridoma cell cloned to produce many identical cells 4. Cells divide rapidly and produce lots of the same antibody 5. A large amount of the antibody can be collected and purified
62. Explain why hybridoma cells are needed for the production of monoclonal antibodies	They can divide and produce the antibody
63. Describe ways that monoclonal antibodies can be used in tests	<ol style="list-style-type: none"> 1. For diagnosis (e.g. pregnancy tests) 2. In laboratories (e.g. measure hormone/ chemical levels or detect pathogens in blood) 3. In research (e.g. locate or identify specific molecules in cells or tissues by binding to them with a fluorescent dye)
64. Name a disease that monoclonal antibodies could be used to treat	Cancer
65. Describe the way that monoclonal antibodies can be used to treat disease	Monoclonal antibody bound to radioactive substance, toxic drug or chemical Antibody binds to/ delivers substance to cancerous cells and stops them growing and dividing without harming other cells in the body
66. Describe why monoclonal antibodies are not yet as widely used as everyone hoped when they were first developed	They create more side effects than expected
Microbiology (triple biology only)	
67. How do bacteria multiply?	By simple cell division (binary fission)
68. How often do bacteria multiply?	As often as once every 20 minutes If they have enough nutrients and a stable temperature
69. Give 2 ways that bacteria can be grown	<ol style="list-style-type: none"> 1. Nutrient broth solution 2. As colonies on an Agar gel plate
70. Why are uncontaminated cultures of bacteria required?	For investigating the action of disinfectants and antibiotics
71. Define 'aseptic technique'	A method of preventing contamination by micro organisms
72. Describe how to prepare an uncontaminated culture using aseptic technique	<ol style="list-style-type: none"> 1. Sterilise petri dishes and culture media 2. Pass inoculating loop through flame 3. Transfer microbes to the culture media 4. Secure petri dish lid with adhesive tape 5. Incubate upside down
73. Why must petri dishes, culture media and the inoculating loop be sterilised?	To kill microbes that would otherwise contaminate the culture
74. Why must the lid of the petri dish be secured with adhesive tape?	To prevent the lid from coming off So that unwanted microbes don't get in (or out!) and cause contamination
75. Why must the petri dish be stored upside down?	To prevent condensation falling onto the Agar surface (causing individual colonies to spread)

76. What is the maximum temperature of an incubator in school?	25°C
77. Why are schools only allowed to use this temperature or lower?	To stop human pathogens growing
78. Define 'zone of inhibition'	The clear area around an antibiotic or disinfectant on an Agar plate Where the bacteria have been killed or prevented from growing
79. Give the equation used to calculate the cross sectional area of a colony or zone of inhibition	πr^2
80. <u>Skills question</u> Calculate the area of a colony that has a diameter of 4mm, to 1 decimal place	Diameter is 4mm so radius is 2mm. $\pi \times 2^2 = 12.6\text{mm}^2$
81. Give the equation for calculating number of divisions in a certain growth period	= (60/ number of minutes for 1 division) x number of hours bacteria are dividing for
82. Give the equation for calculating the number of bacteria at the end of a growth period	= number of bacteria at the beginning of the growth period X $2^{\text{number of divisions}}$
83. <u>Skills question.</u> E. coli divide every 20 minutes. A burger is left out of the fridge for 4 hours. a. Calculate number of divisions in this time. b. There were 2 bacteria on the burger at the start. Calculate the number of bacteria after 4 hours.	a. $(60/ 20) \times 4 = 12$ divisions b. $2 \times 2^{12} = 8192$ bacteria
84. <u>Skills question - HT</u> Salmonella divide every 40 minutes. A person leaves BBQ chicken out of the fridge over night for 12 hours. There were 8 bacteria on the chicken at the start. Calculate numbers of salmonella on the chicken in the morning. Express your answer in standard form to 2 significant figures.	Number of divisions = $(60/ 40) \times 12 = 18$ Number of bacteria after 12 hours = $8 \times 2^{18} = 2097152$ Answer in standard form to 2 significant figures = 2.1×10^6 bacteria
Lifestyle disease (non-communicable disease)	
85. Define 'risk factor'	An aspect of lifestyle or substances in the body/ environment that is linked to an increase in the rate of a disease
86. Name the 3 risk factors whose effects are linked to cardiovascular disease	Diet, smoking and exercise
87. Name the risk factor for type 2 diabetes	Obesity
88. Name the organs that alcohol affects	The liver and brain function
89. Name the 2 effects of smoking on the lungs	Lung disease and lung cancer
90. State the possible effects of smoking/ alcohol on unborn babies	Can lead to miscarriage, premature births, low birth weight and stillbirths
Cancer	
91. Describe 'cancer'	The result of changes in cells That lead to uncontrolled growth and division
92. Define 'benign' tumour	A growth of abnormal cells Cells contained in one area , usually in a membrane Cells don't invade other parts of body
93. Define 'malignant' tumour	Cells Invade neighbouring tissue And break away to spread to different parts of body in blood

	Forming secondary tumours
94. Cells from which type of tumour are cancerous?	Malignant tumours
95. Name the risk factors for cancer	1. Lifestyle risk factors = Carcinogens, including ionising radiation , eg Smoking, too much alcohol, the Sun's ultraviolet rays, some infections eg HPV 2. Genetic risk factors
Drug discovery, development and testing	
96. Where do drugs traditionally come from?	Plants and micro-organisms
97. From where does the heart drug digitalis originate?	Foxgloves (plant)
98. From where does the painkiller aspirin originate?	Willow (plant)
99. From where does penicillin originate and who discovered it?	<i>Penicillium</i> mould (microbe) By Alexander Fleming
100. Where do most new drugs come from?	Synthesised by chemists in the pharmaceutical industry May use plant chemical as starting point
101. Why do new medical drugs have to be tested and trialled before use?	Check they are safe and effective Check for toxicity, efficacy and dose
102. Describe preclinical testing	Testing that is done in a lab using cells, tissues and live animals
103. Who takes part in clinical testing?	Healthy volunteers and patients
104. Describe clinical testing	Very low doses of drug used at first If drug is safe, further trials done to determine optimum dose
105. What happens in double blind trials?	Some patients are given a placebo Neither Doctors nor patients know who has taken the real drug (this reduces bias)
106. When can results of drug testing and trials be published?	Only after scrutiny by peer review
107. What are the benefits of the peer review process?	Helps to detect false claims Establishes an agreement (consensus) about which claims should be regarded as valid
108. Explain the problems associated with reports of scientific developments in the popular media	Not subject to peer review May be oversimplified, inaccurate or biased